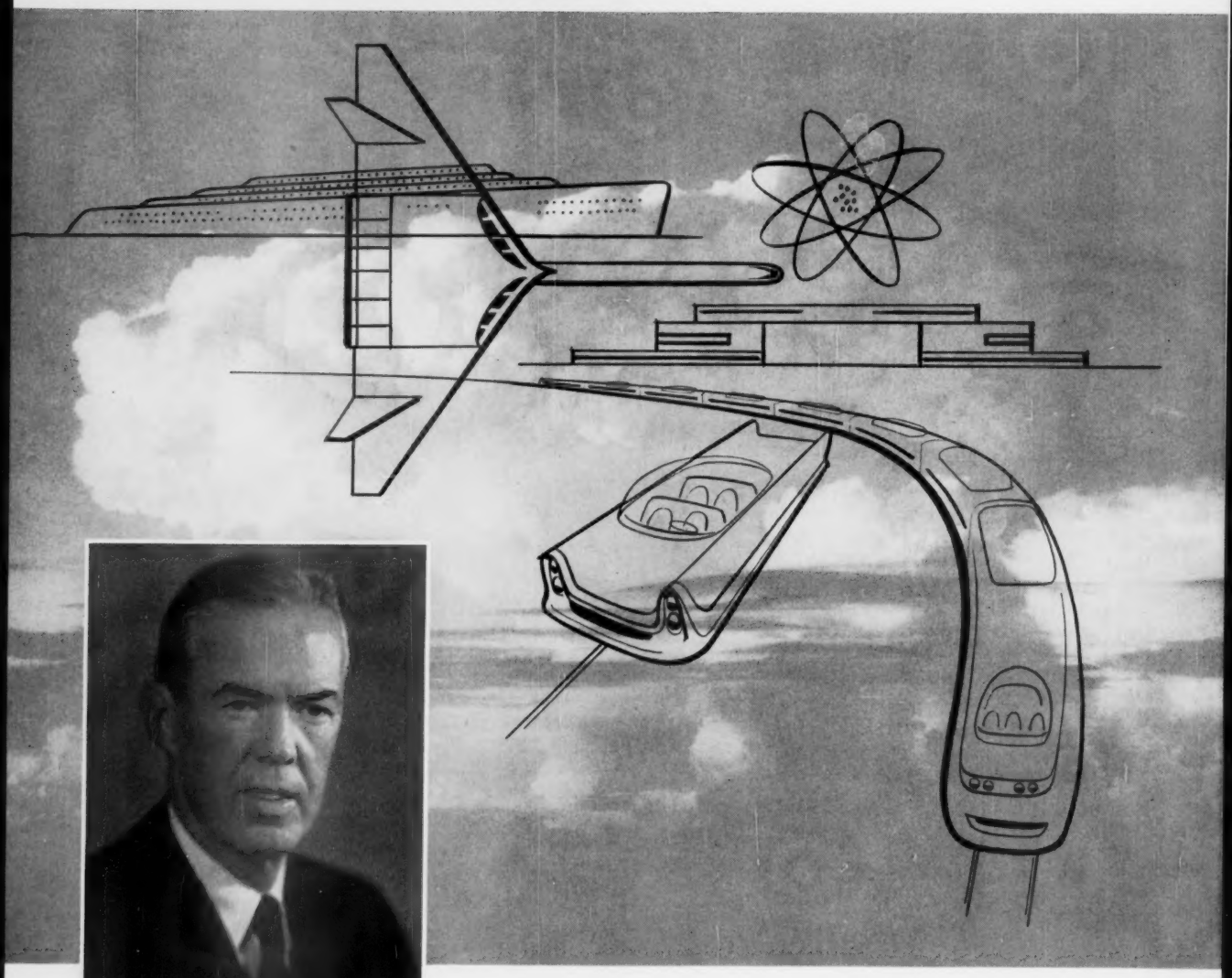
NOVEMBER, 1956

American Engineer

IN THIS ISSUE . . .

The Engineer in the Atomic Era

By
THOMAS E. MURRAY, P.E.,
Member, Atomic Energy Commission



Commissioner Murray

Plus: **Engineering with People by Frederick H. Zurmuhlen, P.E., R.A.**
Ivory Hunting on the Campuses by Harold Skamser
National Engineers' Week Report
Latest Capitol Hill News

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ALFRED IDDLES

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NOVEMBER

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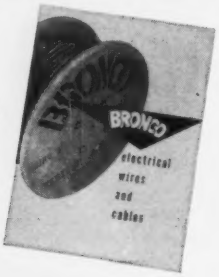

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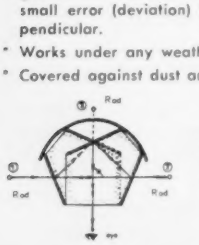

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Letters to the Editor

Aides . . .

Dear Editor:

I note the letter in the September issue from Raymond J. Rosenberger concerning engineering aides. It does not seem to be common knowledge among your readers that in many industries such persons are very commonly employed and that there are schools, the so-called "technical institutes," which last year graduated about 50,000 such assistants for the practicing engineer.

In education this is a field which is not being overlooked and the ECPD has undertaken the accreditation of these technical institutes with the current list including some thirty institutes with numerous curricula.

The use of such assistants in the electronic and mechanical industries is extensive and increasing. The Westinghouse Electric Corporation has made a survey of its engineers' duties and has instituted a policy of definite assignment of engineering assistants to each small group of engineers.

Various titles are used in industry, but the most common are engineering aide, engineering assistant, or engineering associate. Certificates or diplomas offered by the various technical institutes may also carry such titles.

I hope this information may be of interest to Mr. Rosenberger.

J. D. RYDER, *Dean*,
College of Engineering,
Michigan State University,
East Lansing, Mich.

"Big" Engineers? . . .

Dear Editor:

"Engineering is not Big Business . . . American business is big because of its Big Engineers."

I believe the (above) idea has merit. Perhaps the readers of the AMERICAN ENGINEER should toss it around a bit.

B. E. ANDERSON, P. E.,
New York, N. Y.

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Does It Pay? . . .

Dear Editor:

I think that it would be of the greatest interest to all the Society members if you would reprint in its entirety the article entitled, "Does Chemical Engineering Pay?" in the September, 1956, issue of *Chemical Engineering* magazine.

Particularly, the young engineers would be interested in the author's conclusion that it doesn't!

SAMUEL A. BALKAN, P. E.,
Newton Highlands, Mass.

Solution? . . .

Dear Editor:

Regarding the article "Professional Status of the Engineer Employed in Government," (AE, July), a solution exists to the problems involving engineers in Civil Service. Simply, it is that the Government utilizes private enterprise in engineering for performing all tasks which are now performed by Civil Service. . . .

EARL G. GOETSCH, P.E.,
Detroit, Mich.

P.E. Defined . . .

Dear Editor:

Much has been said and written in attempts to educate the public as to what Professional Engineers are and for what they stand. Unfortunately, the desired results have not been obtained for the simple reason that there is no simple, clear, and concise definition of the term, "Professional Engineer."

A good deal of the confusion stems from the fact that there is no definition of Professional Engineer that is agreed upon, and comprehended, by engineers themselves. For the engineering profession to obtain full appreciation from the general public, a definition of what engineers are, comprehensible to Professional Engineers must be evolved.

As yet, no adequate definitions of the English words, engineer, engineering, profession, and professional have been presented nor have any received general recognition. Many and varied definitions can be found in dictionaries, encyclopedia, technical publications, and text books. Each is vague, obtuse or both.

In an attempt to initiate the evolution of a set of universal definitions, the following are submitted for consideration:

Engineer—One who through his training in pure and applied science skillfully practices the art of directing the great sources of power in nature for the use and convenience of man.

Profession—A calling in which one has acquired some special knowledge that is used to instruct, guide, or serve others in some art according to the best moral and ethical standards of our civilization.

Professional Engineer—One who practices the art and science of engineering ever mindful of his moral responsibilities to man and his profession.

GUY FORBES, P.E.,
Tulsa, Okla.

Unionism . . .

Dear Editor:

It has recently come to our attention that an alumnus member of Phi Beta Epsilon fraternity of the Massachusetts Institute of Technology, Mr. John Taft, has become secretary of Engineers and Scientists of America, a group which is attempting to trade-unionize engineers and scientists.

We recognize the rights of any individual to pursue any interests he may wish, provided he does not implicate others in his plans. Mr. Taft, last spring, sent considerable advertising matter to various fraternities in engineering colleges, and used as one of his references the fact that he is a member of Phi Beta Epsilon.

It was the unanimous vote of the board of directors of the Phi Beta Epsilon Corporation to condemn such a use of the fraternity's name as not being in accord with the aims of the fraternity.

It was also the unanimous vote of the directors to empower the president to take any action necessary to prevent the use of the fraternity's name in such a connection again.

As the aims of the majority of the fraternity members are similar to the aims of your Society, it was voted that the secretary inform you of the above action in the hope that your Society, a national organization, could possibly undo some of the harm which the unwarranted use of Phi Beta Epsilon's name may have caused.

KENDALL H. SPENCER,
Secretary, Phi Beta
Epsilon Corporation,
Winchester, Mass.

NOVEMBER MEETINGS OF NOTE

Tool Engineering Conference—Annual Conference, November 2-3, Illinois Institute of Technology, Chicago, Illinois.

Society of Automotive Engineers—Fuels and Lubricants Meeting, November 8-9, Mayo Hotel, Tulsa, Oklahoma.

National Electrical Manufacturers Association—Annual Meeting, November 12-16, Traymore Hotel, Atlantic City, New Jersey.

Society of Naval Architects and Marine Engineers—Annual Meeting, November 14-17, Waldorf Astoria Hotel, New York City.

Operations Research Society of America—National Meeting, November 15-16, Hotel Mark Hopkins, San Francisco, California.

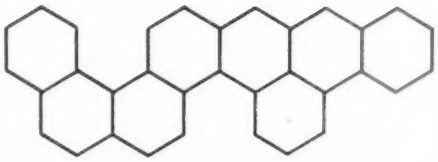
American Rocket Society — Annual Meeting with ASME, November 25-30, Hotel McAlpin, New York City.

American Society of Mechanical Engineers—Annual Meeting, November 25-30, Statler Hotel, New York City.

International Automation Exposition —November 26-30, New York Trade Show Building, New York City.

American Institute of Consulting Engineers—Annual Dinner, November 27, Waldorf Astoria Hotel, New York City.

National Chemical Exposition—November 27-30, Cleveland Auditorium, Cleveland, Ohio.



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Besides attractive remuneration, you will enjoy other benefits unexcelled in the entire industry—retirement plans, health and life insurance, college educational reimbursement plan, regular vacations plus extra year-end vacations with pay. Easily-reached mountain, desert and beach resorts in sunny Southern California offer year 'round attractions for you and your family.

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PROFESSIONAL NEWS IN CAPSULE FORM

A Roundup of Late Events for Professional Engineers

Structural Engineering Conference Set Dec. 3-5

The Civil Engineering Department of the University of Illinois, in cooperation with the Division of University Extension, announces the Fourth Illinois Structural Engineering Conference to be held December 3-5.

Individual sessions will be devoted to a discussion of: concrete specifications, steel specifications, foundations for single story building and high-strength structural steel. Printed programs may be obtained from R. K. Newton, supervisor of engineering extension, 116 Illini Hall, University of Illinois, Urbana, Illinois.

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$50,000 Damages Awarded To California Engineer

For illegally copying and using without authority uncopyrighted building plans and specifications, a Superior Court jury in Los Angeles County recently awarded damages of $50,000 to Bent H. Cardan, structural engineer and general contractor.

The jury's award is unprecedented in California records. This is the first time that plans and specifications, developed over many years by an engineer and general contractor, have been regarded with respect due copyrights and patents.

Charles Schaffner Named ASEE Division Secretary

Assistant Dean Charles E. Schaffner, director of the evening session of the Polytechnic Institute of Brooklyn, has been named secretary of the Educational Methods Division of the American Society for Engineering Education.

"Come quick Frank! This pigeon just solved the problem we've been working on for over a month."

P. B. Gordon Nominated For ASHAE Presidency

Peter B. Gordon, vice president of Wolff and Munier, Inc., New York, has been nominated for the presidency of the American Society of Heating and Air-Conditioning Engineers, it has been announced by the Society President John W. James of Chicago, Ill.

The report of the Nominating Committee also includes for first vice president, Elmer R. Queer, director and professor of engineering research, Pennsylvania State University; for second vice president, Arthur J. Hess, president of Hess-Greiner & Pollard, Los Angeles, Calif.; and for treasurer, Charles H. Pesterfield, professor of mechanical engineering, Michigan State University.

Nominees for three-year terms on the Council of the Society are: Richard S. Dill, chief, Heating and Air Conditioning Section, National Bureau of Standards, Washington, D. C.; William G. Hole, vice president, American Air Filter of Canada, Ltd., Montreal; Peter J. Marschall, manager of engineering, Abbott Laboratories, North Chicago, Ill.; and Wesley O. Stewart, branch manager, Johnson Service Co., Los Angeles, Calif.

Dr. Schutt Appointed Technical Consultant

Dr. Herman C. Schutt, a chemical engineering specialist, has been appointed technical consultant at Armour Research Foundation of Illinois Institute of Technology, Chicago.

An NSPE member, Dr. Schutt will provide consultation on projects in the Foundation's chemistry and chemical engineering research department, according to Clark E. Thorp, department manager.

Several Major Companies Are Making Efforts To Recruit Engineers Overseas

Several companies have been making efforts to recruit engineers in Europe and in Argentina including the Glenn L. Martin Co., Republic Aviation Corp., and General Electric Co.

Martin has signed up twenty-one aeronautical engineers from Argentina, but only nine have reported to work. Republic has received written acceptances from seven in the Argentine.

Martin, Republic and the aircraft and gas turbine division of General Electric have used various recruiting approaches in Europe. GE advertised in Britain, France, Italy, Western Germany, Sweden, Switzerland, and Norway. Republic put "non-citizen engineers wanted" advertisements in American trade magazines with large circulations overseas.

About forty engineers responded to the Republic ads, and the corporation has selected thirty who will be interviewed in Europe. GE received enough replies to choose forty for interviews. General Electric has already hired fifteen others including engineers from China, Iran, the Philippines, and the Union of South Africa. Most of them are now awaiting security clearance. All will be required to become U.S. citizens.

Otto H. Hall Presents NSPE Brochure To AIEE On Professional Conduct

Otto H. Hall, a member of NSPE's Ethical Practices Committee, presented a proposed NSPE brochure on "Rules of Professional Conduct for Engineers" to the American Institute of Electrical Engineers at their fall general meeting in October.

Mr. Hall explained that the National Society has prepared the brochure with the hope that it will be accepted by the founder societies and others as a standard for the profession. He said that NSPE proposes that the brochure be a convenient reference containing:

(1) A short treatise on canons, creeds, codes, development and usage (to encourage proper thinking in interpreting ethical practices); (2) The Engineers' Creed as developed by NSPE in 1954; (3) Canons of Ethics for Engineers; and (4) Rules of Professional Conduct.

Engineering and Management Course To Be Given At Univ. of California

Advance announcement of a 1957 engineering and management course to be held on the Los Angeles campus of the University of California, January 21 to 31, is being made by the College of Engineering, the Graduate School of Business Administration and University Extension at the University.

A daily instruction period for each of twenty-five different subjects for the full ten days will be included in the 8:00 a.m. to 5:00 p.m. lectures, according to L. M. K. Boelter, dean of the College of Engineering and Neil H. Jacoby, dean of the Graduate School of Business. The program is designed to be of value to all levels of engineering and management personnel.

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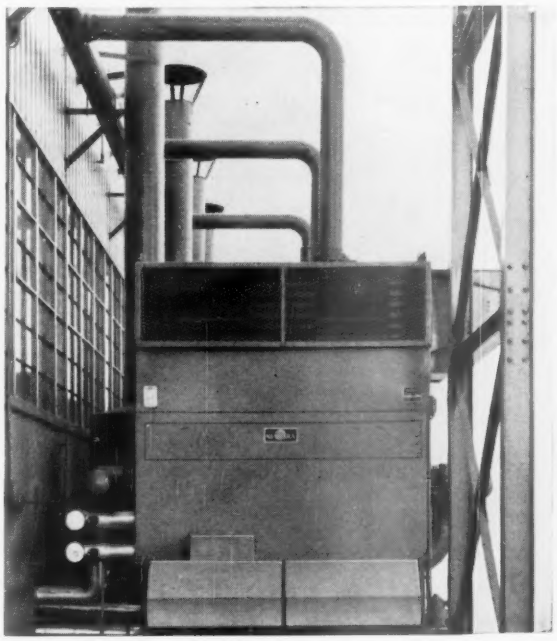

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Twenty-Two Engineers Enroll In Trane Program

Twenty-two graduate engineers representing fourteen states and Canada have enrolled in the six-month specialized training program at The Trane Company, La Crosse, Wisconsin.

Purpose of the "postgraduate" course—initiated in 1925—is to equip the students with the practical engineering skill necessary for the industry before being assigned field responsibilities. Trane's sales force is made up almost entirely of graduate engineers.

The sessions are conducted twice a year with the new class bringing to nearly 400 the number of engineers who have participated in the course.

New Program Established To Attract Engineers

To attract the best professional talent to a possible career in engineering education, Newark College of Engineering has established a new program of education and employment for promising college graduates.

Fully aware that the college must offer opportunities comparable to those in industry to successfully recruit the best engineering minds into the teaching profession, the New Jersey college is offering assistant instructorships to qualified college graduates, and tuition to complete requirements for the master's degree in chemical, civil, electrical, management, or mechanical engineering.

The assistant instructor's teaching schedule is designed so that it does not exceed fifteen hours, to provide him with enough time to complete his graduate studies at NCE within a period of three years.

J. A. Johannessen Elected Phoenix Chapter Prexy

J. A. Johannessen, partner of Johannessen and Girand, consulting engineers of Phoenix and Tucson, has been elected president of the Phoenix area chapter of the Arizona Consulting Engineers Association.

A member of NSPE, Mr. Johannessen attained office on the basis of a special runoff vote when a tie developed for the presidency during the regular election.

Expect 2,500 Engineers At Cleveland Conference

Smaller meeting groups to permit more intimate discussion of factory problems are planned for the eighth National Plant Maintenance & Engineering Conference to be held at the Public Auditorium, Cleveland, Ohio, in January.

The conference—the largest industrial gathering of its kind in the country—attracts over 2,500 engineers each year and is expected to set a record attendance this January. Consequently, it was decided to run ten conference sessions simultaneously so that the audience for each will be smaller.

As is customary, the conference will be held at the same time and place as the annual Plant Maintenance & Engineering Show. The conference will be held for three days, January 28-30, inclusive, while the show will run for four days through January 31.

Raymond C. Dannettel Elected To Fellow In ASME

Raymond C. Dannettel, senior engineer, Electric Engineers Department, Baltimore Gas and Electric Company, Baltimore, Md., has been elected to the grade of Fellow of The American Society of Mechanical Engineers.

A member of NSPE, Mr. Dannettel was cited for his contributions to the advancement of power generation and the dissemination of information on steam turbines and their application.

Major Gen. Itschner Takes Over As Chief Of Engineers

Major General E. C. Itschner has recently been sworn in as Chief of Engineers, U. S. Army. The oath of office was administered by Secretary of the Army Wilber M. Brucker, with other high Army and Corps of Engineers' officers witnessing the ceremony.

General Itschner succeeds Lieutenant General S. D. Sturgis, Jr., Chief of Engineers since December, 1952, who retired from active service September 30. At fifty-three years of age, he is one of the youngest officers to head the Army's Corps of Engineers.

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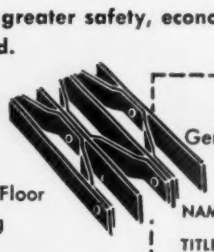

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American Engineer

The Magazine of the Registered Professional Engineer

VOLUME TWENTY-SIX NUMBER ELEVEN

Here is a Solemn Warning from a Distinguished Engineer Pointing Out How the Years Ahead Can Witness Great Progress or Total Destruction

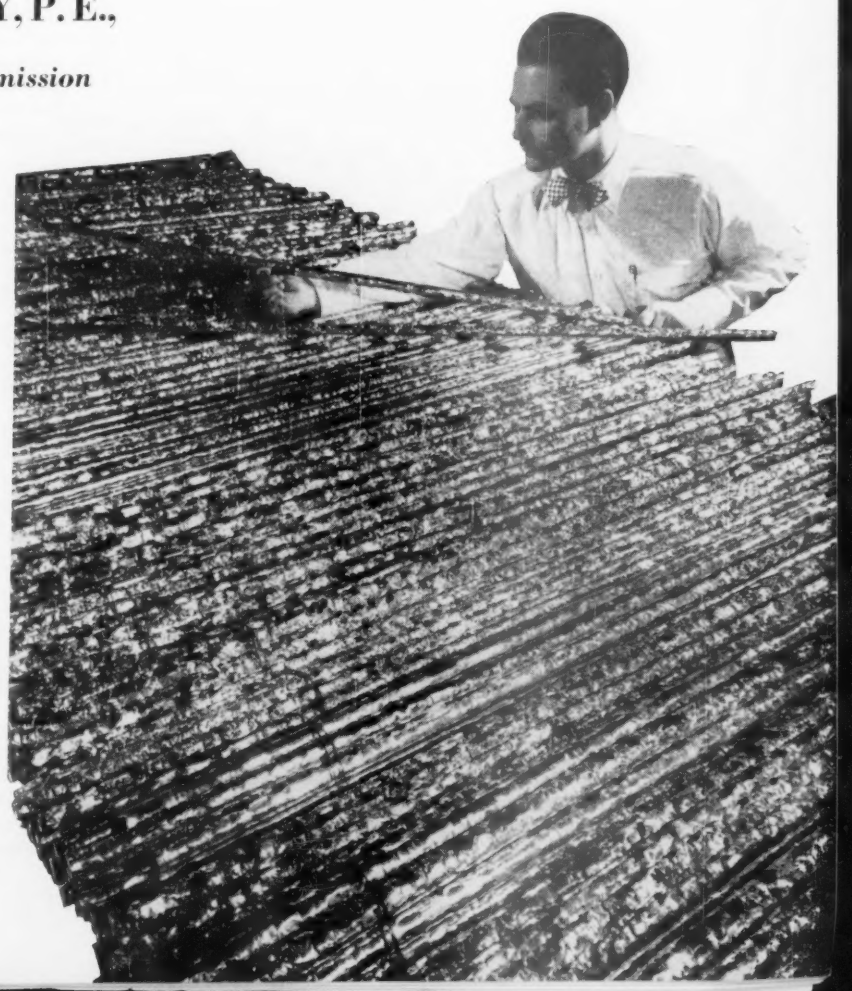
The Engineer in the Atomic Era

By THOMAS E. MURRAY, P. E.,

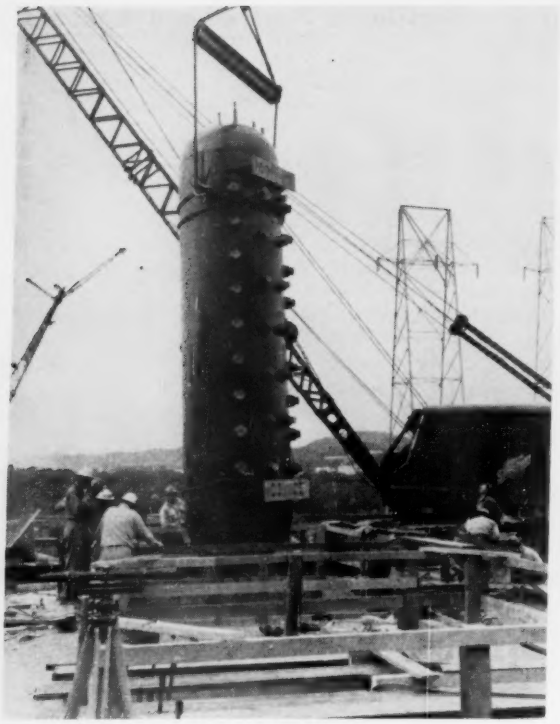
Member, Atomic Energy Commission

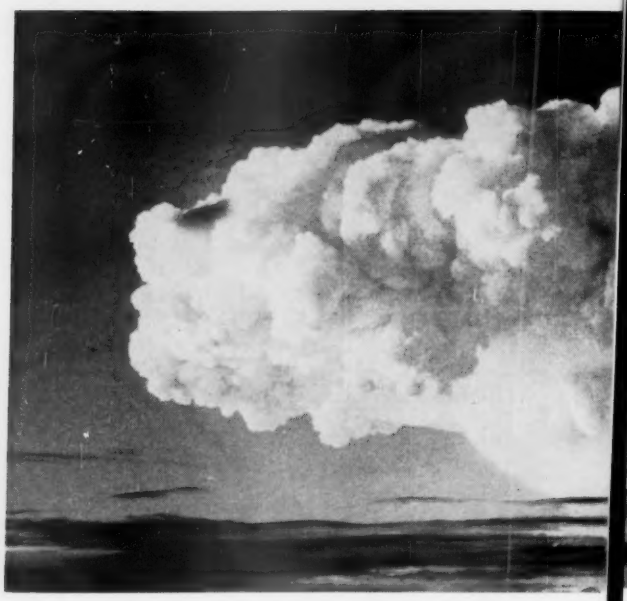
THE realities of atomic energy have made one fact abundantly clear — that no individual can rightly stand apart from mankind or remain unconcerned by his responsibilities for the well-being of his fellow men. The fact of this mutual interdependence among men as a condition of human welfare has been recognized for ages. But the practical consequences of the failure of the individual to assume his responsibilities could—in this nuclear era—be tragedy on a scale not yet experienced. Where failure in the past has meant poverty and death—even of tremendous proportions—failure in the future can bring into question the very continued existence of mankind.

Each individual—and particularly each educated man—has under these circumstances the responsibility of acquainting himself with the facts of atomic energy as they pertain to the possibilities both for the betterment and for the destruction of mankind. The engineer should feel this responsibility to a preeminent degree. For his special qualifications endow him with an ability to comprehend with greater clarity than most, the concrete di-



Westinghouse engineer Alexander Squire examines stock of zirconium crystal bar produced at the firm's Atomic Power Division plant. Slightly lighter than steel, highly resistant to corrosion and heat, the glistening metal plays a key role in the construction of nuclear reactors. Large-scale production first was achieved at this Westinghouse plant.





Left: Installing a Babcock & Wilcox steam drum at the AEC's Pittsburgh area plant. Center: The familiar mushroom cloud following a nuclear explosion is both beautiful and awesome. Right: In the Physics of Solids Building at Oak Ridge National Laboratory, a step in preparation of a

mensions both of the threat and promise inherent in the atom. And this greater comprehension should bring forth in his own actions and in those of his profession concerted efforts, not only to alleviate the threat; but to transform the promise of atomic energy into practical reality.

Quite apart from the danger of catastrophe inherent in atomic energy, engineers would by their nature enthusiastically seek to penetrate its secrets, to harness it in man's service. This is in the very best traditions of the engineering profession. Ordinarily any relationships that exist between the constructive and destructive uses of the various forces of nature are not in themselves of special importance. Yet my over six years experience as a member of the Atomic Energy Commission have convinced me, an engineer by profession, that the promise of atomic energy and programs for its realization cannot rightly be dissociated from the threat. These years of close association with the ever-growing proportions of the menace have intensified my views as to the responsibilities we have, individually and collectively, to accelerate development of the peaceful uses of atomic energy. Moreover, I am persuaded that more widespread awareness of the nature and scope of the danger we face would be accompanied by an increasing insistence that our programs for peaceful employment of the atom be greatly augmented. Engineers have the opportunity and the responsibility of contributing to that wider understanding. But first each must himself become acquainted with the facts. In what follows I shall attempt to indicate some of the more important ones.

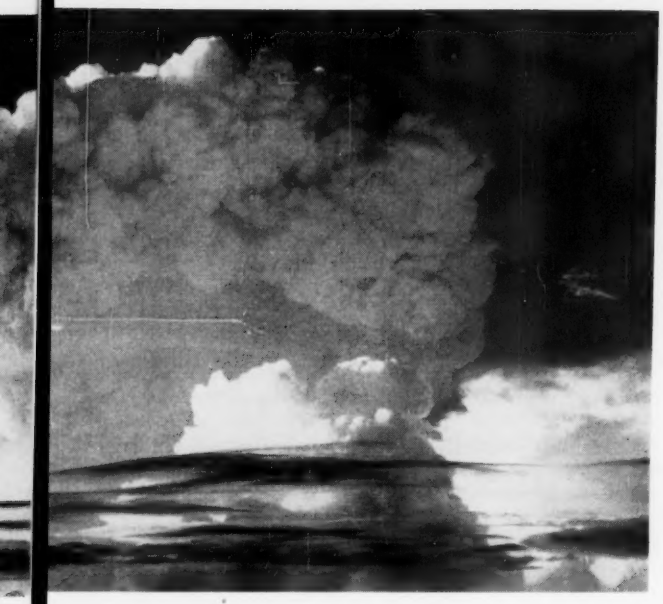
The first is that man has now developed nuclear weapons of such power that the explosion of a sufficient number could render the earth uninhabitable. The President in a speech on September 20, 1956, described the situation in these words:

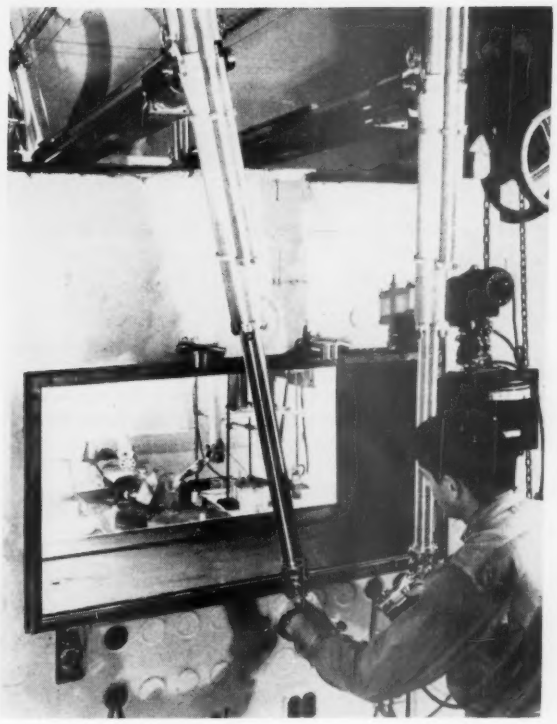
> **"We witness today in the power of nuclear weapons a new and wider dimension of the deadly horror of war. Humanity has now achieved, for the first time in its history, the power to end its history."**

This is the stark, if almost inconceivable reality. As such, one might suppose that the collective intelligence of mankind would be imbued with concern lest man, as a consequence of his actions, be overtaken by a fate so monstrous. Regrettably there is little or no evidence that it has. At least there is little to indicate that the consequences of nuclear warfare are being permitted to exercise the decisive influence which they should wield in determining the actions of nations.

Some insight into the grave nature of the problem can be gained by retracing the course of nuclear weapons development. In World War II the power of a bomb was its explosive force, the force of a blast, accompanied by heat and followed by fire. The atomic bomb, of the kind unfortunately dropped on Hiroshima, was a bomb bigger by many thousands of times than the biggest high explosive bomb dropped during the war. Before we had time fully to comprehend the implications of these weapons we were catapulted into the hydrogen era by the thermonuclear explosion of November 1, 1952. This and subsequent explosions have made it clear that nuclear weapons can be produced, not many thousands but many millions of times the explosive power of World War II "block-busters." Beyond that we know that there is no upper limit to the size of nuclear explosions that can be produced.

The several orders of magnitude by which thermo-





solid sample of extremely radioactive material for analysis is concluded as the scientist, separated from his work by a concrete barrier and a liquid-filled porthole, uses master-slave manipulators, or "mechanical hands," to wash his equipment.

nuclear weapons transcend and even dwarf atomic weapons in explosive power warrants our considering hydrogen weapons as in a class by themselves. But great as is this difference, it is not the more important one. The thermonuclear bomb inflicts destruction by blast and thermal effects over a far larger area than atomic weapons. But it also unleashes destruction in a more insidious form—in the form of a fallout of radioactive particles. This radioactive fallout, which consists largely of the products of atomic fission is localized in the case of atomic weapons. But the fallout which results from the detonation of hydrogen weapons reaches in its effects far beyond the areas of blast and thermal damage.

The contamination which results from this fallout creates hazards of both an immediate and long term nature. An immediate hazard is created in thousands of square miles adjacent to the site of a thermonuclear explosion carried out in close proximity to the ground. In this area the radioactivity is of such intensity that protective measures would have to be taken for days and sometimes even weeks and months to prevent death or serious illness to those exposed.

Hazards of a long term nature would include those due to internal exposure to radiation from materials inhaled or ingested. The most important contribution to this hazard is that from radioactive strontium. And the potential danger associated with this substance is of such immense importance that it is worth discussing in some detail.

Radioactive strontium is one of the products released in all nuclear explosions. Unlike the strontium ordinarily occurring in nature, it emits beta particles, one of the three types of radiation given off by radium and its decay products. Moreover, its radioactivity persists over long periods of time—its intensity dying off by a factor of one-half every twenty-eight years.

Some of the radioactive strontium produced in the explosion of a large thermonuclear weapon falls to earth rather quickly. But a significant quantity is shot up into the stratosphere where it diffuses throughout the entire envelope of atmosphere surrounding the earth. From the stratosphere it settles slowly into the lower regions of the atmosphere where it soon falls to earth. Since only a fraction of the amount stored in the statrosphere falls to earth during the course of a year, the contamination continues to be deposited for years after the explosion has taken place.

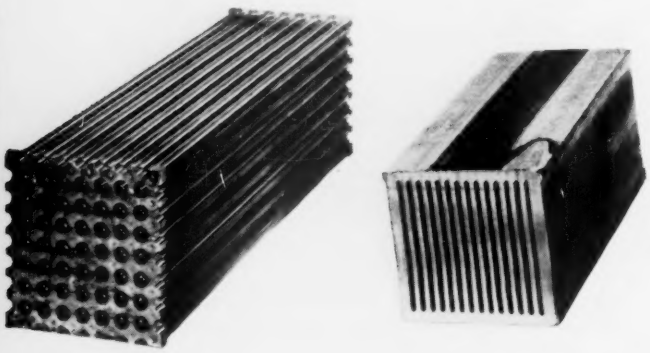
From the soil and by other routes the radiostrontium enters the structure of growing plants. It then passes as food into the human body where it is absorbed in the bone structure. Here its beta radiation, if sufficiently intense, can cause changes in the bone and even bone tumors. Of this fact there is no question. Questions do arise, however, in attempting to establish the amount of radiostrontium that can be carried by humans without harmful effects. Nevertheless, from what we know it is clear that the explosion of a sufficiently large number of thermonuclear weapons could bring about concentrations of radiostrontium in human bones on a world-wide basis which are considerably in excess of the maximum considered permissible for the general population.

This is one of the consequences that must be understood by the term all-out nuclear warfare. There are others. There is for instance the harmful effects of a genetic nature that mankind would incur as a result of large scale use of nuclear weapons. Although our knowledge is not sufficient to predict the degree of damage; it is adequate to warn us of the disaster that could lie in this direction.

These and other consequences of all-out nuclear warfare should, I think, convince every individual that he

has a responsibility to prevent this present threat from becoming a reality. I am of the belief that one of our best hopes for insuring against this is to educate each individual to a very real understanding of the potential for good and for evil in atomic energy. From widespread understanding of this type there would come forth concerted efforts to insure realization of the potential for good inherent in atomic energy. Such a positive approach poses special responsibilities for the engineer. For his is the "art and science by which the properties of matter and the sources of power in nature are made useful to mankind." And atomic energy as a source of power is one of the potentially most attractive of all the applications of atomic energy.

As the nations of the world strive for higher living standards and as ever increasing inroads are made in the world's energy and material resources, the availability of energy becomes a matter of crucial importance. Certain aspects of the problem are of a long range nature; others are of such immediacy as to require action beginning now.



Fuel elements from a reactor. Left: Uranium oxide pellets in zircaloy tubing held in end plates so coolant flows over length. Right: Zirclay-clad U-235 element with coolant channels.

Over the long term there is for example the necessity of providing for population growth. The world's population will have risen in the course of the present century from 1.5 billions to between four and five billion individuals. Even in the absence of improved living standards and depletion of material resources, this increase in population would have posed eventual problems. The fact is, of course, that strenuous efforts are being made the world over, and particularly in undeveloped countries to increase standards of living. It has been estimated that, if the entire world were to use mineral resources at the rate characteristic of this country, six times the amount currently being used would be required. The implications in terms of increased energy requirements are at once apparent.

MEANWHILE the availability of these resources is dwindling. For example, where we were formerly using copper ores containing five per cent copper, we are now reduced to processing those averaging nine-tenths of one per cent. In consequence greater expenditures of energy are required. A like condition obtains with respect to iron ore. Within a few years we will be processing ores containing twenty-five to thirty per cent iron. By contrast the ore originally mined in the Mesabi Range contained fifty per cent and more iron. If we start using taconite ore we might be using two or more pounds of coal to produce one of steel where formerly one pound sufficed for producing one pound of steel from high grade ores.

These three factors of population growth, prospective improvement in living standards, and depletion of materials resources combine to heighten the importance of energy to man's future. Such is the need that we are forced to look beyond the limited resources of conventional fuels to a new source. And such a source—almost unlimited in its potential—is available in atomic energy.

The need to accelerate development of this new source of energy is a matter for action now. Shortages of conventional fuels are of present concern for some countries abroad, especially the highly industrialized nations of Western Europe. In such countries imported fuels are necessary to maintain and expand their economies. For example, in the case of Western Europe, the total net expenditure of fuel imports have been placed at between 1.5 and two billion dollars for 1955, and these are expected to increase to five billion dollars by 1975.

The United Kingdom has already determined that the development of atomic electric power is essential to its future and has undertaken its development as a matter of national policy. Under its program a large number of power stations will be built by 1965, having a combined installed capacity of one and one-half million kilowatts.

The pattern of atomic power application in underdeveloped countries is still a matter of conjecture. This is not to say that the need is uncertain. There are many situations where shortage or inaccessibility of conventional fuels argues for the application of nuclear power now. In others, sound planning for the future should mean that at least a start be made now in this direction. What eventuates from this pattern of need will depend on the progress we as a nation make in developing atomic power. The fact is, however, that formidable barriers stand in the way of progress in this field. And there is the further fact that these barriers lie, in large degree, in the field of engineering. Some of the problems involved are new; in others the only element of newness derives from their application in association with the utilization of atomic energy. Most of the traditional branches of engineering have already felt their impact in some degree. This combination of the new with the familiar and this diversity in scope can best be illustrated by examples.

TO begin with the familiar, some of the most crucial problems that confront us in building power reactors are those of corrosion. In water cooled reactors, for example, the corrosion resistance in very hot water of the materials involved is a decisive element in their selection. Poor corrosion characteristics can have unfortunate consequences in reducing heat transfer in the reactor, in increasing the radioactivities carried in the coolant, in causing malfunction of moving parts, and deterioration of the coolant-containing boundaries. One thing is clear, we need far more information than we now have concerning the corrosion characteristics of conventional materials in ordinary water at high temperatures. The basic requirement of corrosion-resistance is not new, but it is one of crucial importance in reactor design.

Corrosion-resistance, for example, is important in the

selection of materials for reactor fuel elements. These fuel elements, which contain the heat-releasing fissionable materials, must operate at high temperatures in the presence of intense radiation with little consequent deformation. In addition to being corrosion-resistant the materials used should capture as few neutrons as possible. This combination of requirements has given rise to the use in reactors of an entirely new metal, zirconium.

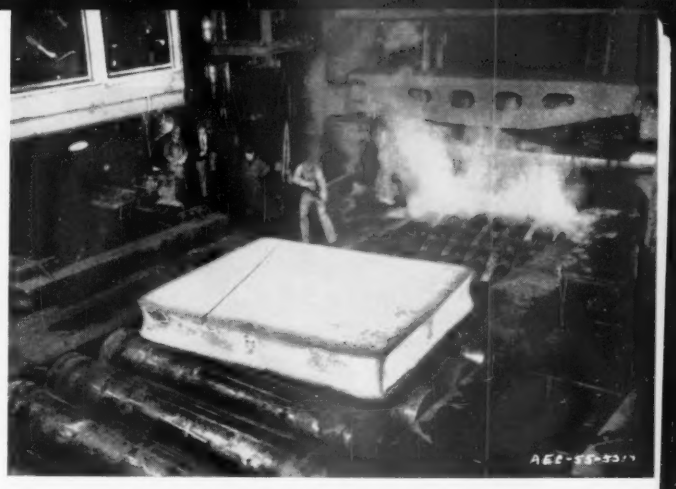
There is another approach to the fuel element problem which would eliminate the difficult problems involved in fuel element fabrication and corrosion. That is to dissolve the fissionable material or fuel in the coolant which circulates through and removes heat from the reactor. The present difficulty is that the chemical solutions which carry the fuel are very corrosive and also tend to break down under reactor operating conditions of high temperature and radiation. To solve this problem will be to take a long stride toward the realization of a reactor that is fundamentally attractive with respect to such characteristics as control, safety, and the economics of power production.

In the broader field of metallurgy there is this same insistent need to cope with older problems while at the same time extending our knowledge to solve the newer ones. We have still to learn much more about the welding of materials used in reactor plants than we now know. Several factors make it especially important that we acquire this knowledge. Among them are the necessity of using welded joints to meet stringent leakage standards that must be met in reactor construction and the severe hazards that can accompany failure.

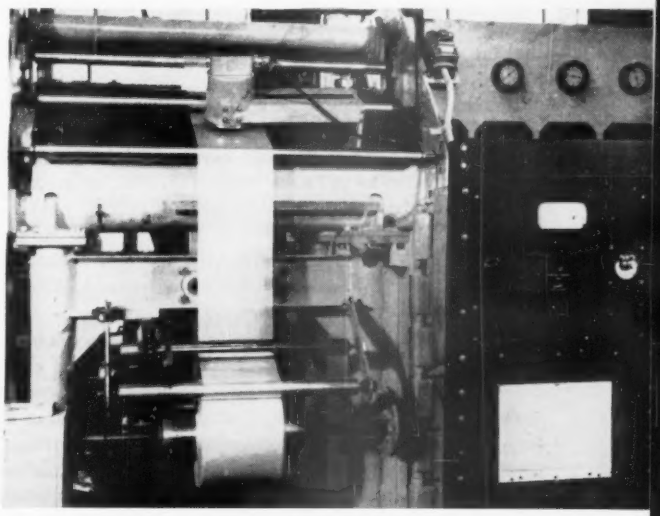
In its newer aspects atomic energy has already brought with it the development of new metals such as hafnium, and more intensive development of others such as beryllium and the liquid metals. But there is one metal that presently requires much more development than it has hitherto received. I refer to plutonium, a fissionable material produced in all nuclear reactors. As power reactors come into operation more and more plutonium will be produced, processed, and made available as fuel for new reactors. As matters now stand, however, we just do not have sufficient information to enable us to use this plutonium satisfactorily as a reactor fuel. Hence, the development of plutonium metallurgy must stand high on the priority list of problems whose solution is vital to the future of nuclear power reactors.

Problems not less difficult than those already mentioned will be encountered in the other branches of engineering: in developing technologies of liquid metal coolants, in synthesizing complex circuitory to control nuclear processes, in extending heat transfer knowledge to meet the special requirements of reactors, and in myriad other forms. Beyond these problems, however, there are two general considerations pertaining to the engineering development of reactors which are of paramount importance. Both concern the potential hazards of reactor operation. And for that reason each brings into focus the responsibility that the engineer has to the community.

One of these general problems is that of reactor safety. The possibility exists that power reactor accidents could conceivably occur in which large amounts of radioactivities would be dispersed over wide areas. Even conceding



Rolling a stainless-clad steel plate at Lukens Steel Company, Coatesville, Pa., to help house the core of an atomic reactor. The huge slab is being turned 90-degrees for additional rolling. The plates will reduce to a final thickness of 8-5/18 inches.



Here is a Beta Gauge measuring weight per unit area of plastic as it comes through manufacturing process.

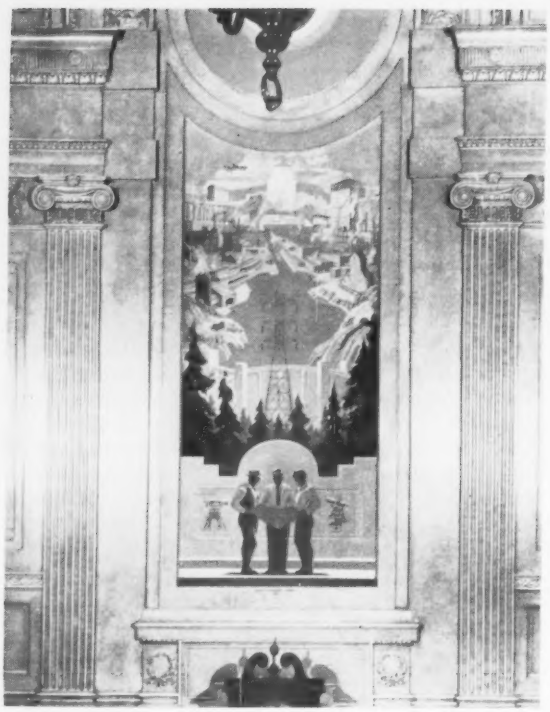
These large tanks are furnaces in which the zirconium process gets under way at the Westinghouse Atomic Power Division. The process ultimately results in production of zirconium "crystal bars" 99.9 per cent pure.

Above is an aerial view of the Shippingport, Pa., site operated for the AEC.

that the probability of their occurring is small, the potentially catastrophic consequences of such accidents requires that no step be overlooked which would contribute to reducing their probability to the smallest value possible. A reactor incident could have its origins as much in a faulty valve as in faulty control circuits, as much in poor mechanical design as in the area of reactor physics. Hence, each engineer involved in the design of atomic power plants will feel an additional sense of responsibility that derives from a knowledge of the possible ill consequences of failure on his part.

The second of these problems is perhaps less immediately apparent. Yet it goes to the very root of the engineer's responsibilities. I refer to the long range consequences of the development of atomic energy insofar as they could contribute to contamination of the environment in which man lives—and in which his children must continue to live. The fact is that the increasing utilization of atomic energy will inevitably increase the amount of radioactivity present in the world. We must not let the accompanying hazards from this radiation rise above acceptable levels. And we are assured by competent groups of scientists that we need not do so if we are alert to the responsibility we have for finding safe ways of disposing of these radioactive substances. This then is another area in which the engineer must overcome formidable problems in the interest of discharging his responsibility for the welfare of mankind.

The problems which I have cited are only barely indicative of the large number that confront the engineer in the broad fields of atomic energy. These will be for him a call to action. And a call that will, I am confident, be sharpened by the ever widening threat to humanity from nuclear weapons. It is a summons which can and must be met by bringing to bear the full genius of the American engineer in a concerted effort to eliminate the barriers that now stand between us and widespread utilization of atomic energy. I know of no field of engineering endeavor where the individual could contribute more in the service of this nation and of mankind.—**End.**



The wonderful world of the professional engineer is pictured by this mural in a Canadian government building. The author points out, however, that accomplishment must be followed by responsibility.

About the Author . . .

Mr. Murray

Thomas E. Murray, who was born in Albany, N. Y., graduated from Yale University's Sheffield Scientific School in 1911 with a B.S. degree in mechanical engineering. Within a few years after graduation from college, he entered directly into the field of management, becoming president of the Metropolitan Engineering Company, founded some years earlier by his father, himself an engineer of achievement in the electrical and power industry. From 1915 to 1949 he served as president of that company, and of the subsequently founded Murray Manufacturing Company. He has served as a member of the Atomic Energy Commission since 1950.

His ingenuity and creative ability are indicated by the some 200 patents which have been granted to him covering a wide range of achievements. During World War II, Commissioner Murray won a special award from the United States Government for his invention of a new method of manufacturing shells which saved tons of strategic material and accounted for twenty-five per cent of all World War II trench mortar shell production.

Well known for his sound judgment and rare mixture of kindly understanding and adherence to principle, he has been called upon to serve the public in many capacities. Among these are his successful peace-making efforts in 1941 in the important Bell Aircraft labor controversy and his successful efforts in labor disputes involving the New York City bus companies, as well as his services in 1946 and 1947 as impartial representative of the United Mine Workers Welfare and Retirement Fund, of which he was appointed chairman in 1946.

Ivory Hunting on the Campuses

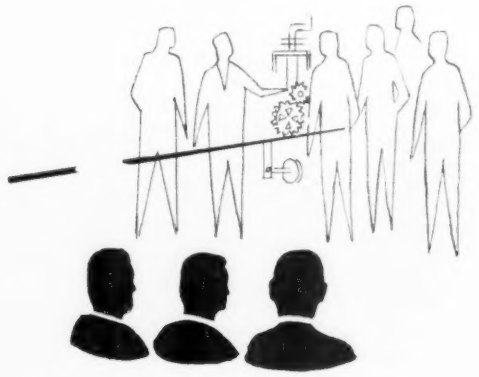
By

HAROLD SKAMSER,

Chairman, Engineering Placement,

Michigan State University

SOME company recruiters have expressed an interest in methods of increasing the number of prospective employees to be interviewed at each college campus. This brief summary of methods which have been effective, and others which show promise, is presented to assist in increasing the number of contacts between engineering students and recruiters. In other words, what can be done when the experience has been that the number of recruiters nearly equals, or even outnumbers the interviewees.



In recent years the number of companies and organizations sending recruiters to the campus has far outnumbered the seniors and graduates. By March 1, 1956, approximately 700 groups had sent representatives to interview seniors at Michigan State University. The number of graduates has been on the order of 200 per twelve month period for several years. It is estimated that the number of engineers needed each year will grow from about 32,000 now, to 40,000 in 1970, when the total employed in the country will reach 800,000.

Even under present conditions, some of the "Big Name" groups like General Electric, General Motors, etc., and the glamor industries and those with well known consumer products have had good turnouts for interviews. Others with equal or better opportunities have found very few students on their interview schedules. Students are so busy trying to keep up with their courses, that they must limit the number of interviews to a few companies which interest them for some specific reason. How to insure that more of these students look at the splendid opportunities offered by companies other than those mentioned above is the purpose of this summary.

The first prerequisite is that the company or organization seeking talent, must *make itself known* to the average engineering student. Based on experience of seven or eight years in engineering placement, in industry and with recruiters, the following suggestions are presented for your consideration.

1. **Regular visits to the campus, *both* fall and spring.**
2. **"Confabs" with the faculty, at the coffee break or in the engineering buildings.**
3. **Summer employment of faculty; and students, with one, two or three years of engineering education.**
4. **Scholarships—One company interviews the five top candidates for its scholarship at the time of a regular recruiting visit and also offers summer employment to most of them.**
5. **Institutional type advertisements in college publications such as:**
   a. **Michigan State *Daily News* for several successive issues before the interview date. (Display type ad to arouse interest and serve as a reminder.)**
   b. **The *Spartan Engineer*, student published engineering magazine. (Many of the "Big Name" companies make this their regular practice.)**
   c. **The Michigan State University magazine, for alumni contacts and inquiries.**
6. **Posters (at least two color) which emphasize the key attractions of employment with your company, by means of symbols or other brief and graphic means.**
7. **Films and visual aids to the campus, for use in classes and society meetings, and for display in engineering buildings.**

It is also suggested that recruiters visiting the campus check through the "active" alumni files, which also include the names of returning veterans.

The approaches mentioned above for making the company or organization known to the average engineering student should emphasize the most attractive features of employment with your organization. Very few of our students have preconceived notions of just where they

(Please turn the page)

Skamser

(*Continued from page* 17)

want to work. There are, however, certain factors which seem to be most influential in reaching a decision about employment.

Contrary to some beliefs, *salary is not the first consideration.* There are several reasons for this. First the range of salaries is fairly narrow and consistent. Secondly, with today's graduates, other things loom larger and more important. There have been several surveys made of students about to graduate, and salary, usually comes out as the fifth or sixth most important factor in choosing a job.

Among the half a dozen things often mentioned as most important to a young graduate are:

1. **Opportunity for development and advancement.**
2. **Opportunity to do creative and interesting work. (The *boys* think that the glamor industries such as aircraft, electronics, etc., offer this.)**
3. **Opportunity to continue with graduate work in the community, or at a nearby college or university.**
4. **Location in the home area (or near it) for the young engineer or his wife, or in a region noted for its attractive climate, or other features. (Some students select the area where they want to live and then accept the best opportunity there.)**
5. **Previous experience with a company, or in a line of work, or a chance to do something in the line of his own special interest.**
6. **Salary. Students want at least the going rate and are sometimes tempted by differentials of $25-$50 or more per month. But generally they are more interested in the long range salary advantages.**
7. **Security and fringe benefits.**

In the midwinter of 1955-1956 the going rate for students with a bachelor's degree and no experience was in the $400 a month range; for a master's degree, $450 plus a month, and for a Ph.D. from $600 a month and up. Salaries appreciably below the going rate ($15-$25 a month or more) result in difficulties in securing men; and according to a national survey, a high turnover rate in the first few years. While, in companies and industries with a starting salary considerably above the going rate, the turnover is generally considerably below the national average.—***End.***

Werwath Named Committee Head

Karl O. Werwath, president of the Milwaukee School of Engineering, has been appointed chairman of the Committee for Supporting Technical Personnel on President Eisenhower's new National Committee for the Development of Scientists and Engineers.

Mr. Werwath, who is president of the Milwaukee Chapter of the Wisconsin SPE, is also chairman, Technical Institute Division, American Society for Engineering Education, and president of the Technical Institute Foundation, Inc.

A national director of NSPE from Texas, Noah Hull, vice president of the Hughes Gun Company, is a member of the task force of this working group dealing with utilization of all supporting technical personnel. Hull is also chairman of the Professional Engineers Conference Board for Industry.

The Committee is engaged in studying and carrying out recommendations concerning the utilization of scientific and engineering technicians.

North Dakota Society of Professional Engineers—Annual Meeting, November 2-3, 1956, Grand Forks, N. D.

Puerto Rico Society of Professional Engineers—Annual Meeting, November 24, 1956, Puerto Rico Institute of Engineers Building, San Juan, Puerto Rico.

Alabama Society of Professional Engineers—Annual Meeting, December 8, 1956, Birmingham, Alabama.

North Carolina Society of Professional Engineers—Winter Meeting, January 17-19, 1957, Washington Duke Hotel, Durham, N. C.

Idaho Society of Professional Engineers—Annual Meeting, January 18-19, 1957, Boise, Idaho.

Texas Society of Professional Engineers—Annual Meeting, January 23-26, 1957, Plaza Hotel, San Antonio, Texas.

Wisconsin Society of Professional Engineers—Annual Meeting, January 24-26, 1957, Schroeder Hotel, Milwaukee, Wisconsin.

NSPE Spring Meeting—February 15-16, 1957, Hotel Fort Sumter, Charleston, South Carolina.

NSPE State Presidents' Conference—March 7-9, 1957, Memorial Union, Purdue University, Lafayette, Indiana.

NSPE Annual Meeting — June 6-8, 1957, Statler Hotel, Dallas, Texas.

Robbins Attends Tau Beta Pi Meet

Paul H. Robbins, NSPE's executive director, served as chairman of the business meetings for the second straight year at Tau Beta Pi's national convention in October at the University of Kansas, Lawrence, Kansas. All but three of the Association's ninety-nine collegiate chapters were represented at the session.

The convention consisted of four business meetings, several specially arranged discussion periods, and a banquet, which included Herbert Hoover, Jr., among its speakers.

Tau Beta Pi is the national engineering honor society. Mr. Robbins is director of fellowships.

Granger New Dean

A. T. Granger, president of the Tennessee SPE and head of the University of Tennessee civil engineering department at Knoxville, became dean of the University's College of Engineering on Sept. 1, 1956.

Also on that date, N. W. Dougherty, past president of the American Society for Engineering Education, and a past vice president of NSPE, who had reached the compulsory retirement age, became "Dean Emeritus." Both appointments were made at a meeting of the Board of Trustees' executive committee.

Documents Ready

Preliminary copies of documents—approved by NSPE and AIA—to be used in engineering-architect and architect-engineer agreements are available free upon request by writing to the headquarters of the National Society.

Declared Ineligible

A Portsmouth, Ohio, man has been denied a place on the November ballot for engineer of Scioto County because he was not a registered surveyor—as required by the laws of Ohio—when nominated by a write-in vote at the May Primary.

Floyd Hillman, the Republican nominee, was declared an ineligible candidate by a special court of three appeals court judges.

Engineering Employment Practices

Digest

A short digest of a monthly bulletin published by the National Society of Professional Engineers in the interest of advancing cooperative relations between professional engineers and their employers. To regularly receive the complete publication which is distributed widely to industrial, commercial and educational organizations, write the NSPE, 2029 K St., N.W., Washington 6, D. C.

✓ **The Third Circuit U.S. Court of Appeals has ruled that the Taft-Hartley Act does not require the National Labor Relations Board, when forming bargaining units confined to professional employees, to group all professionals in a single bargaining unit. The issue arose at the Jersey City plant of Westinghouse. Some of the engineers are represented by the electrical workers' union. The remainder obtained a separate engineering union vote over the company's protest. When the company refused to bargain with them on the grounds the unit had to include all the engineers, the NLRB issued an unfair labor practice charge. The court rejected the company's appeal, holding that the professional provisions of the law require only that the NLRB may not create a mixed unit of professionals and nonprofessionals without the prior majority vote of the professionals. This does not mean that all the professional employees must be in the same unit, the appeals body held.**

* * * * *

✓ The engineers represented by the electrical workers' union are the same group which has brought a test case in the District Court to enforce their right to a decertification election. The test case involves the general principle whether professional employees are entitled to a separate decertification election when represented by a heterogeneous union. NSPE has filed a brief in the local court in support of the principle involved. The hearing on the case is scheduled for November 2.

* * * * *

✓ **In another case involving Westinghouse—at its Buffalo plant—the question before the court is whether the NLRB may include some nonprofessionals in a voting unit with professionals. The Board says it may do so if the professionals "predominate" the unit. NSPE has entered this case also to advise the court that if the Board's ruling is not upset it will have widespread adverse effects on the entire profession. The NSPE brief cites the danger in having any nonprofessionals vote on the collective bargaining question because they may control the result in a close vote and frustrate the wishes of the majority of the professionals. In an earlier case under this doctrine, for example, the vote was forty-two for the union, thirty-nine against it. Nine nonprofessionals were allowed to vote as part of the group. The NSPE brief says this illustrates how the nonprofessionals may exercise the controlling voice, even though Congress, in enacting the professional provisions of the law, made it clear that professionals and nonprofessionals have different interests, backgrounds and attitudes.**

In a more recent case at the Texas Co., Westville, N. J., professional engineers and chemists voted against union representation by a tie vote—15 to 15. Had even one nonprofessional been allowed to vote with the professionals he could have controlled the result.

* * * * *

✓ General Electric's Aircraft Gas Turbine Division, Cincinnati, Ohio, has published *Career Counseling Guide for Engineers.* The 36-page pamphlet is designed to help the engineer evaluate his present personal and professional status and his future road of development. Included are various check lists and evaluation tables on degree of interest in various types of engineering activities, educational background, personal work history, personal and social characteristics and an over-all evaluation chart.

* * * * *

✓ ***Supervision of Scientific and Engineering Personnel*, published by Industrial Relations Section, Caltech, is a comprehensive outline of major problems in the professional employee - management relationship. Single copies are $8.75, including a *Conference Leader's Guide for Supervision of Scientific and Engineering Personnel*, now in preparation.**

* * * * *

✓ Type of work offered, reputation of the company and location of the company all outrank salary as the major reasons engineering graduates select their jobs, according to a recent survey. After salary, the major reasons were training programs offered, size of the company, company interviewing policies and company informational literature. Starting salaries for the 1956 recruiting season advanced eight to ten per cent over 1955. The average monthly range is reported at $410-435. The complete report is in *Machine Design* for September 20, 1956.

ENGINEERING WITH PEOPLE

By Frederick H. Zurmuhlen, P.E., R.A.,

Commissioner, Department of Public Works,
City of New York

STRESS, strain, tension, strength, capacity, load, tolerance, pressure, flexibility, fatigue . . . these are factors which the engineer must consider when he is dealing with materials. He recognizes that all materials are subject to these factors and that materials differ in their suitability and performance when these factors are applied. Identical materials perform differently under varying conditions of temperature and pressure, or when combined with other materials. The engineer selects the most suitable material to do the job or to meet the conditions required. Selection is based on knowledge and understanding of all the appropriate materials. Constant appraisal, inspection, testing, evaluation, research and education help to increase and improve this knowledge. The science of engineering progresses in proportion to these efforts. The leadership of the engineer in his profession, in his community, and in the organization he is a part of, depends upon his devotion to these elements of progress.

Interested New Yorkers watch progress on the foundation work of the Chase Manhattan Bank's new head office building. The world's greatest city seemingly never stops growing as the engineers in the Department of Public Works well know.

The engineer, however, is concerned with another "material"—human material. Many of the terms we use in regard to materials are also used to describe human behavior, and in fact owe their origin to human behavior. People are similar in that they are similarly affected by the same factors but they differ in their capacity and manner of performance. A person reacts differently under different conditions or under the same conditions at different times. His behavior is influenced by other people.

While there are many variables in the behavior and reaction of human beings, there are also many constants or patterns that are recognizable. Studies have shown that the reaction of employees to their company and to their supervisors is related to the attitude of the company and the supervisors. Business and industry have recognized the importance of the relationship of behavior to attitude, and have made much progress in the last ten years in developing training programs for supervisory personnel aimed at a better understanding by the supervisor of the effect he has upon the performance of others. Through a logical application of the relation of cause and effect in working with people, the supervisor is given the opportunity to better understand human relations.

MANY of us in government have been aware of the leadership private industry and business has acquired in the development of supervisory and executive personnel. Some government agencies already have adopted programs of their own to make on-the-job relations between employees more effective and productive. In the City of New York the first major step in this direction on a city-wide basis was initiated in February of 1955. The Department of Personnel announced the establishment of a course to be conducted in conjunction with the School of Industrial and Labor Relations of Cornell University to train trainers in the field of human relations. The course was entitled "Developing Leaders in New York City Agencies," and all departments and agencies were invited to participate and to designate individuals to attend the course and then return and set up supervisory training programs within their agencies.

The Department of Public Works, as the principal engineering, architectural and construction agency of the city government, selected one of its staff members to attend this initial twenty-session course. About halfway through the course our representative in the program suggested that the program be instituted within the department and that the executive staff be acquainted with the program and its possibilities.

The advisability of introducing the program to the top level of the department was proved by the interest and enthusiasm aroused. The initial executive staff conference was followed by a series of five weekly sessions at which the members of the executive staff, working with

our conference leader, were able to participate in the conference phase of the program as it would reach their supervisory personnel. In effect, the staff took the course. This set the stage for carrying the training program down the line.

THE Department of Public Works employs more than 4300 in approximately 160 different job classifications. Engineer, architect, cleaner, bridge operator, sewage treatment worker, elevator operator, laborer, plumber, sludge boat captain, furniture maintainer, core drill operator and motor vehicle operator are only a few of the many designations of jobs performed by these employees. More than 500 positions in the Department are of a supervisory nature. The Department employs one of the world's largest staffs of licensed professional engineers and registered architects. The total engineering and architectural personnel in all categories exceeds six hundred.

The formal phase of our supervisory training program was developed as a series of ten two-hour weekly conferences set up under these main discussion headings:

Session 1. Objectives of the forum.
2. Understanding people.
3. Motivating employees.
4. The role of the supervisor.
5. The supervisor as a leader.
6. Human relations in action.
7. Relating principles developed to department activities.
8. Demonstration of use of principles in a department program.
9. Solving problems in supervision.
10. Applying good management.

The sessions utilize such guided conference aids as slip conferences, buzz sessions, attitude surveys, role playing, films, case history discussions and problem solving. The conferences have reached the second level beyond the executive staff. A total of 160 supervisory and executive employees have participated and their reaction is almost unanimous in favor of continuing and extending the program.

One of the obstacles to overcome in adapting a program being used by private industry to government is the time-worn attitude that civil employment is different from private employment. Cliches such as "profit motive" are relied upon to demonstrate the difference. The initial conference session in each series helps to break down this resistance. Discussions, such as "how government agencies actually compete with one another and even with private business," serve to develop better understanding of the applicability of management principles of business to government. Most important of all, discussions of people, morale and motivation lead to recognition that the civil employee has the same needs and drives as the private employee. True, government with its many checks and controls seems at times to inhibit change and progress. Determination and effort do much to offset this situation. The supervisor and executive in government becomes less apathetic toward training and development programs once he has the opportunity to discuss this problem with his associates. The supervisory training program has, itself, accomplished this purpose at the outset.

THE next major problem in any training or development program is that of translating the training attitudes and principles into operating attitudes and principles. The training conference can demonstrate the effectiveness of people working together with a leader. How do we make this a standard for doing business once the training conferences are ended? The supervisors have part of the answer themselves—greater consciousness by all supervisors of the leadership required of them.

Each supervisor who has sat in on the conference discussions agrees he now has a more logical or "scientific" approach to his relations with people off the job as well as on. Each level of supervisors still asks for more tangible evidence of acceptance at the levels above. This points the way toward introduction of meetings between different levels to solve supervisory problems.

The road ahead is still long. Attitudes, opinions, habits, obsessions are not easily or quickly changed. But we are on the road to improve supervisory management techniques and leadership.—**End.**

About the Author . . .

Mr. Zurmuhlen

Frederick H. Zurmuhlen, Commissioner of the Department of Public Works of the City of New York, is an engineer and an architect. He has served as Commissioner of the Department of Public Works under three mayors. In that capacity he has been responsible for the direction of a department with 4,200 employees. His department is the chief architectural and construction arm of the city and is charged with the design and building of hospitals, health centers, libraries, courts, welfare centers, firehouses, police stations, repair shops, bridges and water pollution control projects. Since his appointment as Commissioner in 1947, Mr. Zurmuhlen has progressed the vast post-World War II construction program of the city in these fields, exceeding $450,000,000.

From 1937 to 1941 he served as consulting engineer to the United States New York World's Fair Commission. From 1941 to 1943, as chief engineer of the George F. Driscoll, Walsh Construction Company, Trinidad contractors, he was in charge of building the $86,000,000 army base on that island.

As chief engineer of the George F. Driscoll Company of New York City and of the George F. Driscoll Company, Venezuela, he was in charge of design and construction of hotels, office buildings, a hospital, and other facilities in Venezuela.

This old Currier & Ives print shows the Brooklyn Bridge in its—and New York's—younger days. The city's Department of Public Works employs more than 4,300 in approximately 160 job classifications. More than 600 engineers and architects are with the Department.

TV Films for Engineers' Week Feature AEC, ODM Officials

Two prominent government officials will appear on the 1957 National Engineers' Week TV films.

The two are Thomas E. Murray, P.E., a member of the Atomic Energy Commission, and Arthur S. Flemming, director of the Office of Defense Mobilization.

They will appear on two of the one-minute films prepared for TV station breaks. The other four one-minute films in the set of six offered by NSPE will feature TV network personnel in tributes to each of the four major engineering classifications—civil, mechanical, electrical, and chemical.

In announcing the 1957 films, National Engineers' Week Chairman John L. Bahr stated that the engineering profession was "quite fortunate in having these two high-ranking officials appear in behalf of objectives of the Week."

Mr. Bahr pointed out that both men were widely known and should be able to attract considerable attention to the public service aspects of the observance.

A member of the Atomic Energy Commission since 1950, Mr. Murray holds a degree in mechanical engineering from Yale University's Sheffield Scientific School. He has been a registered professional engineer since 1930, and has been granted approximately 200 patents in electrical and welding research. He has served as federal receiver of the Interborough Rapid Transit in New York City, a federal labor arbitrator, president of the Murray Manufacturing Corporation, and as impartial chairman of the United Mine Workers Welfare and Retirement Fund.

Mr. Flemming is a graduate of Ohio Wesleyan and American Universities, and became president of Ohio Wesleyan in 1948. He was a member of the U. S. Civil Service Commission from 1939 to 1948. He has held a number of Federal appointments, including service as a member of the Navy Department's Manpower Survey Board and the War Manpower Commission during World War II. He was appointed a member of the Commission on Organization of the Executive Branch of the Government, and chairman of the Defense Mobilization Board. In his position as director of the ODM, Mr. Flemming is a statutory member of the National Security Council.

The six one-minute films will be available from the National Society at $25 per set. The films were produced in a well-known Washington, D. C., studio, and all are suitable for use on public service TV time. Reports from Engineers' Week chairmen for the 1956 observance indicate that the one-minute films used last February reached a huge TV audience throughout the country.

A 15-minute tape recording for use on radio will also be offered this year. The program is entitled "Engineering and the Atomic Era." It features professional network radio performers in a dramatized explanation of the role engineers are playing in building the technology of the atomic era. The tape recording is available from the National Society for $6.

Chapters may also order the radio tape recording used in 1956 entitled "Project Satellite—An Engineering Step to Outer Space." Since this deals with the coming space satellite activity, it is perhaps even more timely in 1957 than it was last year. The tape recording may be ordered for $5.

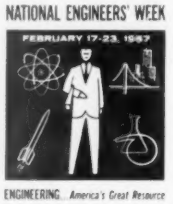
A set of six slides designed to get extensive TV coverage is available for $10 per set. The slides feature poster-type art work and printed copy calling attention to the Week and the contributions of the professional engineer.

Other aids for the Week, such as posters, banners, newspaper mat stories, gummed seals, and logotypes, are ready for distribution. A price list and description of these aids appears on the opposite page.

The promotional kits for National Engineers' Week have been put in the mails. They should be distributed throughout the local chapters and state societies by mid-November.

Chairman Bahr again called attention to the 29-minute color film "American Engineer." This film, produced by the Jam Handy Organization for Chevrolet, is available to all NSPE affiliates at no charge. Through special arrangements with Jam Handy, 300 16mm prints of the film have been reserved for use during the week of February 17-23, 1957.

The film was shown to the Board of Directors at the White Sulphur



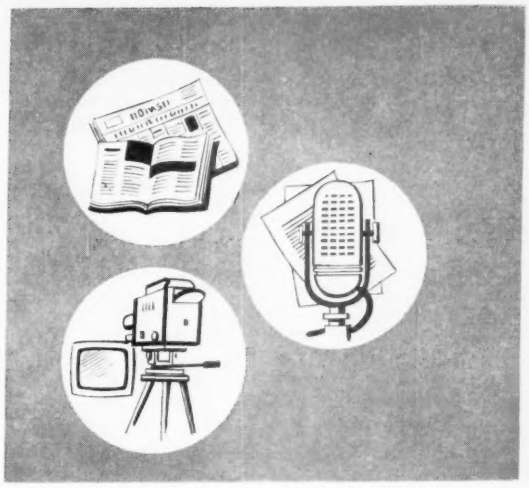
Springs meeting, October 26. It was introduced by Chairman Bahr.

The film may be obtained by writing to the Jam Handy Organization, 2821 East Grand Boulevard, Detroit 11, Michigan. Chairman Bahr pointed out that several groups have already written in to reserve the film. He urged all Engineers' Week Committee chairmen to make their requests as soon as possible.

A series of Action Letters containing promotional ideas for the Week will be sent to all local chapters and state societies.

A 12-page booklet entitled "Engineering . . . America's Great Resource" has been produced by the National Society. It describes the objectives of the Week, and tells how industry can participate. This will be sent to a mailing list of over 500 industrial executives. Sample copies will also be sent to local chapters and state societies. Copies may be ordered, in quantity, from the National Society at no charge. The booklet is designed to stimulate cooperation on the part of industrial management with local professional engineering organizations.

Dramatize Your 1957 Program For National Engineers' Week In The Press, On Radio & TV . . .



HERE ARE the basic promotional aids that will give dramatic impact to your program—the kind of impact that will result in public attention in local newspapers, and on radio and television. All these aids have been expertly prepared to portray engineering as America's great resource. Use the order coupon below.

1. SIX 1-MINUTE TV FILMS: Two of these films feature Thomas E. Murray, P.E., a member of the Atomic Energy Commission, and Arthur S. Flemming, director of the Office of Defense Mobilization. These prominent Federal officials call attention to the Week and to the importance of engineering as a career. The other four 1-minute films are in the form of tributes, to the four major engineering classifications — civil, mechanical, electrical, and chemical. All films will qualify for public service time during TV station breaks. Price: Set of six films, $25.

2. "ENGINEERING AND THE ATOMIC ERA:" Here is a 15-minute tape recorded radio program that points up the role of the engineer in building the atomic age. It features experienced network performers in a dramatization of the engineering effort behind atomic power, radioactive isotopes, and other applications of nuclear energy. Designed for use on public service time. Price: $6 each.

3. SET OF SIX TV SLIDES: Obtain extensive TV coverage through the Week with these expertly prepared slides. Featuring poster-type art work and printed copy calling attention to engineering and the Week's observance, the slides are designed for use during TV station breaks. Price: $10 per set of 6.

4. POSTERS: Colorful 9 x 11-inch cardboard posters carrying the 1957 National Engineers' Week design and theme. The basic promotional item for calling attention to the Week. Can be used on bulletin board, window, and other displays. Large size (18 x 22 inches) also available. Prices: 9 x 11, $4 per 100; 18 x 22, $5 per 100.

5. PAPER BANNERS: Excellent for display use. Three feet long by 6 inches wide. Has poster design and words "National Engineers' Week" in color. Price: $4 per 100.

6. NATIONAL ENGINEERS' WEEK SEALS: Use these brightly colored seals on all office mail from now through February 23. Poster design printed on 1½-inch gummed paper. Price: $3 per 1000.

7. NEWSPAPER MAT STORY ON NEW FEDERAL HIGHWAY PROGRAM: A feature article on how modern engineering has developed from George Washington's day to make possible such a multi-billion dollar road building program. Prepared on mat, ready for immediate insertion in daily or weekly newspaper. Price: 50¢ each.

8. NEWSPAPER MAT STORY ON HOW AN ENGINEERING CAREER BEGINS IN HIGH SCHOOL: A feature article on the type of high school courses and attitudes which lead up to a successful preparation for entrance into college work in engineering. Ready for immediate newspaper insertion. Price: 50¢ each.

9. LOGOTYPE: A metal cut of the 1957 poster design to insert in advertisements, printed matter, etc. All state society and chapter publications should have one. Excellent for use in industrial house organs and other publications. Price: $1 each.

10. "PROJECT SATELLITE—AN ENGINEERING STEP TO OUTER SPACE:" A re-issue of the 15-minute tape recorded radio program distributed last year. Just as timely this year. The program tells the engineering story behind the planning of the earth satellite, and features James Hagerty, Presidential press secretary, making the announcement that the U. S. would build a satellite, and a talk by Dr. Fred Singer, the University of Maryland physicist who had much to do with satellite calculations. Price: $4.

ORDER YOUR AIDS NOW!

National Society of Professional Engineers
2029 K Street, N.W.
Washington 6, D. C.

Sirs:

Please rush me items indicated. I enclose a (check .....)
(money order .....) in the amount of $.....
I understand remittance must accompany order.

Name .....
(PLEASE PRINT)

Address .....

City ..... **State** .....

- ☐ 1. .....One-minute TV films. Set of 6 films @ $25 per set.
- ☐ 2. .....Radio tape, "Engineering and the Atomic Era," @ $6 ea.
- ☐ 3. .....TV slides. Set of 6 slides, @ $10 per set.
- ☐ 4. .....Posters, regular size @ $4 per 100.
  .....Posters, large size, @ $5 per 100.
- ☐ 5. .....Banners @ $4 per 100.
- ☐ 6. .....Seals @ $3 per 1000.
- ☐ 7. .....Newspaper mat story on highway program @ 50¢ ea.
- ☐ 8. .....Newspaper mat story on how engineering career begins in high school @ 50¢ ea.
- ☐ 9. .....Logotypes @ $1 ea.
- ☐ 10. .....Radio tape, "Project Satellite—An Engineering Step to Outer Space," @ $4 ea.

NEW Processes . . .

Bridging Lake Pontchartrain

A cherished dream for many years, the world's longest bridge for vehicular traffic—the 24-mile Greater New Orleans Expressway across Lake Pontchartrain—has become a reality.

Lake Pontchartrain, which lies directly north of New Orleans, is a coastal lagoon roughly 43 miles long and 25 miles wide. It covers 600 square miles in area, with outlets at its southeastern extremity through The Rigolets and Chef Menteur Pass to Mississippi Sound. Jefferson Parish occupies the western portion of the lake and Orleans Parish, comprising the city of New Orleans, occupies the eastern portion of the south shore. St. Tammany Parish covers much of the north shore.

Completion of the bridge meant that at long last water-bound New Orleans would have a direct route to the North and that fast-growing Jefferson and St. Tammany parishes (counties) would have ready access to one another as well as to other sections of the lake.

In December, 1952, Palmer & Baker, Inc., consulting engineers of Mobile and New Orleans, was retained to make preliminary studies in connection with the bridge, to design it, and to supervise construction.

After preliminary discussions and negotiations, a plan was devised which appeared to be workable. Then, in 1953, voters of the parishes voted by an overwhelming majority for a revenue bond issue not exceeding 50 million dollars.

For the information in this feature the editors are indebted to Wayne F. Palmer, P.E., President, Palmer & Baker, Inc.

The Greater New Orleans Expressway, which was completed four months ahead of schedule, was fabricated entirely on land at a $6,000,000 plant near Mandeville, La. The plant was put there for the express purpose of building the bridge by the Louisiana Bridge Company, a joint venture of Brown & Root, Inc., of Houston, Texas, and T. L. James & Co., Inc. of Ruston, La. The successful bid for constructing the bridge was $27,600,000.

The design called for 2,235 concrete spans to be laid on 54-inch cylindrical concrete piles. The spans and piles were assembled of prestressed concrete at the Mandeville plant, then floated by barge out to the bridge site.

Piles were of a special design and process developed by the Raymond Concrete Pile Company. Sections of pile normally 16 feet long were manufactured by a centrifugal casting process. The spinning of the pile sections resulted in an exceptionally dense concrete having strength of over 8,000 pounds per square inch. Each section contains spiral steel reinforcement and 12 small removable rubber cores. After the sections were cast, the cores were removed. The 96-foot piles were assembled by stressing the 16-foot sections on twelve cables, each consisting of 12 No. 6 oil-tempered wires drawn through each hole.

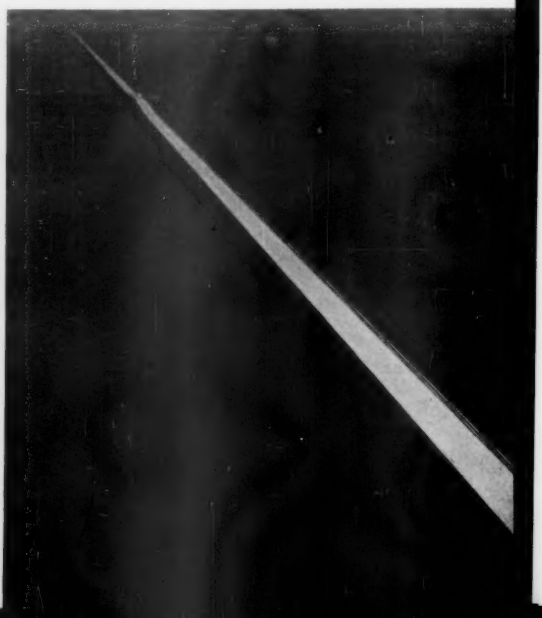
The pile caps are of conventional reinforced concrete design. Precast ashore, they were moved to the site by barge, set in position by crane, and rigidly anchored to the two piles in each bent.

Spans were made in three casting beds each accommodating eight full spans in series. The construction of 2,235 identical spans in the short time schedule was recognized as basically a problem in efficient mass production, requiring a considerable investment in plant, the utmost attention to details of design and methods of fabrication, the minimizing of labor costs and the performance of as much work ashore as possible to avoid weather-caused delays and extra costs from working far out in the lake. In October, the Mandeville

(*Continued on page* 50)

Plant near Mandeville, La., set up to fabricate materials for the bridge.

Centrifugally cast piles have exceptional strength.



Lake Pontchartrain Bridge showing one of three "humps" for boat passage.

Use This Folder

To List Your Firm Name in the . . .

1957 PROFESSIONAL ENGINEERS' BUYERS GUIDE

An Added Feature in the

NATIONAL ENGINEERS' WEEK ISSUE *American Engineer* **FEBRUARY 1957**

Every February AMERICAN ENGINEER is designated as the NATIONAL ENGINEERS' WEEK ISSUE. Once again, during 1957, the week of Washington's Birthday, February 17-23, will be celebrated as National Engineers' Week. The theme will be "Engineering—America's Great Resource." This annual observance honors the professional engineer for the great contribution he has made to the American way of life. The week will be observed across the nation by the President, State officials, governors, mayors and civic leaders. Many of the nation's leading firms will participate with special radio and TV programs, spot announcements, poster displays and like activities. The NATIONAL ENGINEERS' WEEK ISSUE of the AMERICAN ENGINEER will feature these activities for its more than 40,000 registered professional engineer readers. This timely issue will reach your TOP engineering market *(78.4% buy or specify)* during the first week of February.

List your Firm in one of the following:

★ Plan 1.—Three FREE listings of your firm name and address in the Professional Engineers' Buyers Guide. Additional listings
★ $5.00 each.

★ Plan 2.—TO ADVERTISERS in the February 1957 issue . . .

★ a. A key line added to each bold face listing giving the page number of your advertisement.

★ b. Your advertisement keyed to a Reader Service Card and all inquiries forwarded to you.

★ c. No charge for additional listings.

★ Plan 3.—Bold face listings of your firm name and address with a Column Box, or boxes, showing your brand names or
★ services.

★

here is all you need to do:

The Professional Engineers' Buyers Guide is a regular feature of the February National Engineers' Week issue. Product headings are shown on the inside of this folder. Check the subjects under which you want to be listed, fill in the information on the last page and return this folder.

Deadline is January 2, 1957.

Return completed folder to AMERICAN ENGINEER, 2029 K St., N.W., Washington 6, D. C.

Check the Product Headings for your Listings in the 1957 Professional Engineers' Buyers Guide

PRODUCT HEADINGS—BUILDING MATERIALS

- Bathroom Equipment
- Bricks
- Caulking and Sealing
- Cement
- Cinder Blocks
- Concrete Prestressed
- Copings and Gravel Stops
- Corrugated Aluminum
- Door Hardware
- Doors and Sashes
- Fireproof Tiling
- Flooring
- Floor Hardener, Concrete
- Floor Tile
- Glass Blocks
- Heating and Vent. Equip.
- Heating Panels
- Insulation
- Lath Boards
- Lighting Fixtures
- Lime, Building
- Lumber
- Marble
- Metal Ceilings
- Paints, Varnishes
- Plaster, Gypsum
- Plumbing Fixtures
- Radiators
- Roofing, Guttering
- Scaffolding
- Screens
- Sheathing
- Shingles
- Siding and Building Papers
- Slate
- Stair Treads
- Steel Floor Armor
- Steel, Structural
- Stone
- Storm Windows and Doors
- Tapestry Brick
- Terra Cotta
- Tiling
- Timber
- Wall Boards
- Wall Lining
- Water Heaters
- Waterproofing Materials
- Window Glass

OTHER

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PRODUCT HEADINGS—GENERAL

- Abrasives
- Actuated Carbon
- Adding Machines
- Adhesives
- Aerial Tramways
- After Coolers
- Agricultural Equipment
- Air Brakes
- Air Cleaners, Electronic
- Air Compressors
- Air Conditioners
- Aircraft Accessories
- Aircraft, Engines & Equip.
- Aircraft Ground Support Equipment
- Air Diffusers
- Air Recovery
- Air Sampling
- Alarm Systems
- All Wheel Drives
- Aluminum
- Anhydrouse Ammonia Plants
- Antenna Systems
- Architects Supplies
- Artists Supplies
- Assembly Machines
- Automatic Clutches
- Automatic Control Panels
- Automatic Transmission
- Automobile Accessories
- Automatic Door Controls
- Badges
- Balancing Machines
- Ball Bearings
- Batteries
- Belting, Machinery
- Blast Cleaning Equipment
- Blasting Equip., Materials
- Blowers
- Blow Torches
- Blue Print Papers
- Boilers, Accessories
- Boiler Feed Systems
- Bonds (Surety)
- Bookkeeping Machines
- Books, Technical, Scientific
- Booth, Acoustic Telephone
- Brake Linings
- Brass Equipment
- Bridge Decking
- Broaches
- Cable, Electric
- Cable, Multi Conductor
- Calculating Machines
- Calipers
- Cameras
- Carillons, Electric
- Cast Alloys
- Castings
- Ceramics, Elec. Porcelain
- Chair Lifts
- Chemicals, Cleaning
- Chemicals, Industrial
- Chemicals, Sewage Treatment
- Cleaning Equipment
- Clutches
- Coal
- Coatings
- Coils, Industrial
- Commercial Trailers
- Communications Equipment
- Compressors, Rotary
- Computers
- Concrete Additives
- Concrete Equipment
- Concrete Hardeners
- Condensers, Evaporative
- Conduit, Underground
- Control Equipment
- Conveyors
- Cooling Towers
- Copper & Copper Alloys
- Cores, Powdered Iron
- Corrosion Inhibitors
- Couplings
- Courses, Training
- Cranes
- Crystals
- D. C. Capacitors
- Deaerators
- Decalcomania
- Deep Drawings
- De-Humidifiers
- Dehydrators, Air
- Depth Recorders
- Dies
- Diesel Engines
- Diodes
- Disinfectants
- Door Operators, Electric
- **Drafting Materials**
- Drawing Instruments
- Drawing Stands
- Drills, Electric
- Drives, Adjustable-Speed
- Duplicators
- Dust Cleaning Equipment
- Dust Collectors
- Dust Masks
- Dyes
- Earth Moving Equipment
- Electric Brakes, Clutches
- Electric Motors
- Electric Equipment
- Electrical Supplies
- Electromagnetic Devices
- Electronic Communication Equipment
- Electronic Computers
- Electronic Equipment
- Elevators
- Engineers Supplies
- Engines, Gas Turbine
- Engines, Steam
- Evaporators
- Explosives
- External Comparators
- Fasteners
- Fasteners, Belt
- Fathometers
- Filing Devices
- Filing Equipment
- Film
- Finned Tubing Industrial
- Filters, Air
- Filters, Liquid
- Fire Extinguishers, Equip.
- First Aid Cabinets
- Flashlights
- Floor Coverings
- Fluorescent Lamp Ballasts
- Fluorescent Lamps
- Flow Control Systems, Meters
- Food Processing Equipment
- Fork Lift Trucks
- Fountain Pens
- Fuel Oil Additives
- Furnaces
- Furnaces, Enclosures
- Gas Burners
- Gasoline
- Gauges
- Generators
- Germicides
- Glue
- Goggles
- Graphites
- Grating
- Greases
- Grinding Machines
- Hardware
- Heat Exchangers
- Heat Transfer
- High Fidelity Equipment
- Hopper Feeders
- Hose
- Hose, Dust Collector
- Hose, Ventilating
- Hydraulic Equipment
- Hygienic Instruments
- Incinerators
- Index Mechanisms
- Ink
- Insecticides
- Instruments, Process Control
- Instruments, Testing
- Intercoms
- Iron Castings
- Irrigation Equipment
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- Lacquers
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- Lamps, Ultra-Violet
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- Lenses, Optical
- Levels
- Lever Switches
- Lighting Equipment
- Lining Materials, Tank
- Linings, Corrosion Resis.
- Liquid Gas Containers
- Liquid Gas Pumps
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- Liquefied Petroleum Gas Plants
- Locks
- Lubricants
- Lubrication Systems
- Machine Guards
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- Machinery Mountings
- Machinery, Special
- Magnesium
- Magnets, Permanent
- Marine Engines
- Marine Oils
- Masonry Drills
- Measuring Instruments
- Materials Handling Equip.
- Materials, Testing
- Measuring and Controlling Instruments
- Measuring Instruments
- Measuring Tapes and Rules
- Meters
- Micrometers
- Moisture Control Equipment
- Motor Oils
- Motor Trucks
- Mufflers, Engines and Compressors
- Name Plates
- Name Plates, Decalcomania
- Needle Bearings
- Office Equipment
- Office Furniture
- Office Supplies
- Oil Burners
- Oil (Lubricating)
- Oil (Paint)
- Ovens, Industrial
- Packaging Equipment

...Packing—Mechanical
...Paint Brushes
...Paint Sprayers
...Parts, Precision
...Paving Materials
...Pencils, Artist
...Pencils, Drafting
...Pencils, Pastel
...Pens, Drafting
...Photocopiers
...Piling, Sheet
...Pillow Blocks
...Pipe, Aluminum
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...Pipe, Concrete Pressure
...Pipe Fittings & Flanges, Welding
...Pipe, Iron
...Pipe, Steel
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...Polyester Resins
...Porcelain Enamel Panels
...Power Capacitors
...Power Plant Insurance
...Power Transmission Equip.
...Precision Castings
...Precision Instruments
...Preservatives
...Presses, Punch
...Pressure Sensitive Tapes
...Pressure Vessels
...Protective Spectacles
...Public Address Equip.
...Pumps
...Radar Equipment
...Radiators
...Radio Apparatus
...Radio Equipment
...Radio Parts
...Railway Equipment
...Reamers
...Rectifiers, Power
...Reflecting Material
...Refractories
...Refrigerants
...Refrigeration Equipment
...Regulators, Pressure and Temperature
...Regulators, Voltage
...Reinforcement, Wire Fabric
...Relays
...Reproduction, Mach. & Mater.
...Resistors
...Road Building Equipment
...Roller Bearings
...Rolling Mills
...Rotameters
...Safes
...Safety Devices
...Safety Equipment
...Safety Switches
...Saws
...Scale Inhibitors
...Scales
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...Sewage Treatment Materials
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...Sharpening Stones
...Sheet Metal
...Shock Absorbers
...Shores
...Silos
...Slide Rules
...Slings, Wire Rope
...Slitters
...Smoke Control Systems
...Soil Sampling Equip.
...Soil Testing Apparatus
...Sound Systems
...Stainless Steel
...Steel (Other than structural)
...Stokers
...Superfinishing Machines
...Supplies (Machinery)
...Suppressors
...Surveying Instruments
...Sweepers
...Swimming Pools, Supplies and Equipment
...Switch Boxes
...Switches, Electrical
...Tables, Elevating
...Tanks, Cleaning
...Tanks, Storage
...Taps
...Telephone Equipment
...Television Receivers
...Temperature Indicators
...Timers
...Tires
...Toolholders
...Tools
...Tools, Cemented Carbide
...Towers, Hoist
...Tracing Cloth
...Tractor Supplies
...Tractors
...Traffic Direction Equip.
...Trailer Accessories
...Trailers
...Tramways, Aerial
...Transfer Machines
...Transformers
...Transits
...Transportation Equipment
...Trenchers
...Truck Bodies
...Truck Equipment
...Trucks, Lift
...Trucks, Motor
...Tubing
...Tubing, Corrosion Resistant
...Valves & Fittings
...Valves, Solenoid
...Vibration Controls
...Vises
...Voltage Regulators
...Waste Heat Recovery Equipment
...Waste Treaatment Equipment
...Water Conditioning Equip.
...Water Control Apparatus
Water Treating Chemicals
...Welding Electrodes (Alloy)
...Welding Equipment, Supplies
...Well Machinery
...Winches, Hand
...Wire Cloth
...Wire Fabric
...Wire Rope
...Wrenches
...Wrought Iron Plate

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General Electric Co.
Carboloy Dept.
11177 E. 8-Mile Rd.
Detroit 32, Mich.
See advertisement Back Cover

DIESEL ENGINES

General Motors Corp.
General Motors Bldg.
Detroit 2, Mich.
See advertisement Cover III

Caterpillar Tractor Co.
Peoria, Ill.

Worthington Corp.
Harrison, N. J.

DOOR OPERATORS, ELECTRIC

Overhead Door Corp.
Hartford City, Ind.

DRAFTING MATERIALS

Eberhard-Faber Pencil Co.
New York—Toronto
See advertisement page 7

Warren-Knight Co.
136 N. 12th St.
Philadelphia 7, Pa.
See advertisement page 39

Arsco American, Inc.
3308 Edson Ave.
New York 66, N. Y.

Frederick Post Co.
3650 N. Avondale Ave.
Chicago 18, Ill.

FORK LIFT TRUCKS

Revolvator Co.
8782 Tonnele Ave.
North Bergen, N. J.
See advertisement page 6

Automatic Transportation Co.
101 W. 87th St.
Chicago 20, Ill.

HEAT EXCHANGERS

Niagara Blower Co.
405 Lexington Ave.
New York 17, N. Y.
See advertisement page 8

HEAT TRANSFER PANELS

Thermo-Panel Div.
Dean Products, Inc.
616 Franklin Ave.
Brooklyn 38, N. Y.

HIGH FIDELITY EQUIPMENT

Radio Corp. of America
Camden, N. J.

Stromberg Carlson Co.
100 Carlson Road
Rochester 3, N. Y.
See advertisement page 9

HOPPER FEEDERS

Aidlings, Inc.
95 Liberty St.
New York 6, N. Y.

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Allied Metal Hose Co.
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Long Island City, N. Y.

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1½" wide x ½" deep

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1957 Professional Engineers' Buyers Guide

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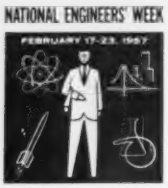

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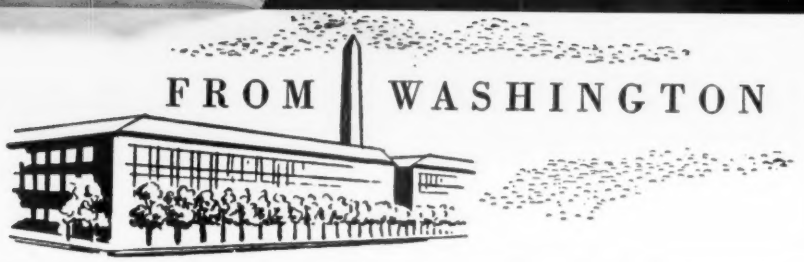

By
Milton F. Lunch,
N.S.P.E.'s Legislative Analyst

A PROFESSIONAL CORPS OF ENGINEERS?

EARLIER this year the 84th Congress adopted legislation to increase the bonus pay of physicians and dentists in the military services from $100 a month to $150 after two years, $200 after six years and $250 after ten years. The $100 a month bonus, or equalization pay, as the doctors and dentists prefer to call it, started in 1947 as a temporary measure and has now become a permanent method to induce doctors and dentists into military service careers in their professional fields. In 1949 veterinarians were blanketed into the $100 a month provision.

The increased bonus compensation added this year has not created, but has clearly aggravated the dissatisfaction among the other professions. And there are now growing signs that strong efforts will be made by the other professions to do something in the next Congress to bring their members in the military service more nearly into line with the health professions. For example, there has recently been some rather strong reaction from the lawyers, and the president of the American Bar Association has declared that one of ABA's objectives next year is to "obtain for lawyers in the Armed Forces the same status with respect to rank and compensation as is presently granted doctors and dentists." The Judge Advocates Association (composed of lawyers in the military services) has reportedly called upon the ABA to lead a fight on the pay adjustment matter and to take other steps to improve the professional recognition of the military lawyers.

These developments are significant to the engineering profession for obvious reasons. But the situation for rectification among engineers and other scientific personnel is considerably more complicated. First, the military lawyers, like the doctors and dentists, have a well-established and clearly defined professional corps. If they can induce Congress into accepting the principle of professional equality it would be a relatively simple matter to provide that all officers in the Judge Advocate General's Corps of the Army (and those assigned Judge Advocate duties in the Navy and Air Force) be granted the bonus pay. Second, the professional corps' of the other professions are all-officer and the officers do not have any combat command functions. Third, the other professional corps' have in common the fact that the minimum rank is first lieutenant. Fourth, the officers in the other professional corps' are required to be legally qualified (licensed or registered) in their profession.

These conditions do not apply to the Army Corps of Engineers, nor to officers assigned engineering duties in the Navy and Air Force. Thus, the situation is doubly aggravated for engineers and will be at least twice as difficult to correct. Yet, there is much evidence that professional engineers in the military services are chafing about the professional discrimination which already exists as well as the additional loss of comparative status brought about by the bonus pay for the doctors.

The pressing problem now is what should be the policy applicable to the engineers in the armed forces should the lawyers succeed in interesting Congress in a review of the matter next year? A number of professional engineers in the military organizations have written NSPE about the over-all problem, and undoubtedly other engineering organizations have been asked to study the question and propose some form of corrective action. Slowly but surely there is beginning to emerge a recognition of the all-important differences between the organization of engineers in the military as compared to doctors and lawyers. It is simply that the latter have true professional corps' and the engineers do not. There has been some reluctance to put the problem this bluntly because of a justified hesitation of saying anything which will reflect upon the high standing and esteem in which the Corps of Engineers is held in the profession and throughout the citizenry and the Congress.

Nevertheless, the comparison as it must be faced by Congress in any consideration of incentive pay for the other professions, and particularly for the engineering profession, forces the conclusion that the same basic legislative approach will not be workable for the engineers. It must be borne in mind that incentive pay for doctors and dentists (actual) and for lawyers (proposed) is confined to those officers who are commissioned in the appropriate professional corps. A doctor or dentist not in the Medical or Dental Corps (if there are any) or a lawyer not in the Judge Advocate General Corps (there are some in this

(Please turn the page)

case) would not qualify for the extra pay or for the first lieutenant minimum grade.

Engineers, however, are by no means all in the Corps of Engineers, restricting the comparison to the Army only for this discussion. They are to be found in great numbers in the Signal Corps, Ordnance, Transportation, Quartermaster, and almost every arm and service of the Army. By the same token, it is estimated that a relatively small percentage of the engineers in the military service are legally qualified (registered under state law) in their profession. An extensive study of the Corps of Engineers by Professor Albert L. Sturm of West Virginia University, prepared for

Such demolition duties as those being carried out above in Korea would be transferred to a Construction Corps under the proposal of a separate professional unit.

the Hoover Commission, reported that as of June 30, 1954, fifty per cent of Corps officers on active duty were not college graduates.

Among the suggestions which have been offered is to provide the bonus pay for any registered engineer regardless of affiliation with the Corps of Engineer. This would run up against an actual example of impracticality, however, along this line: A registered engineer commands an Ordnance Battalion (and argues convincingly that there is more real engineering in this assignment than in many Corps assignments). He would receive the bonus pay. The next-door battalion is commanded by a non-engineer who does a comparably good job. He would not receive the bonus pay. The example could be multiplied many times over, but illustrates the certainty that the military could not tolerate such an inequitable administrative situation. And then there is the problem of what to do about the two engineer-officers who are doing comparably equal jobs in pure professional work. One is registered, the other not. Could a distinction be made in terms of pay for the same rank and the same responsibility and performance?

Analysis along these lines is leading many students of the problem to the conclusion that there is only one practical approach—the establishment of a professional Corps of Engineers, all-officer, restricted to those legally qualified in their profession. Such a reorganization would place the professional engineers on a common plane with the doctors, dentists and lawyers from an organizational and professional qualification standpoint. Under such a plan the professional Corps would attach to other branches and services, and the military units, the professional engineering personnel needed. The non-professional engineering duties of the Corps (such as combat engineer battalions, water supply, road repair, bridge construction, demolition, etc.) would be given to a Construction Corps or some other designated group with an appropriate name. The attached professional engineers would remain under the jurisdiction of the professional Corps (just as the attached Medical Officer remains under the Medical Corps at all times) for promotion, assignment, etc.

Whether such a drastic change in thinking has any chance of adoption in the near future remains open to question. The present Corps of Engineers enjoys perhaps the most respected voice on Capitol Hill. The present Corps has a long and honorable tradition of performance and service. It handles and passes on civil works projects of importance to every member of Congress. In terms of outstanding achievement in time of war the present Corps is known extensively and favorably to the general public. Despite all this there are many of its present officers who would like to see the attempt made as the only approach to equality with the other professions.

Congress is not completely unaware of the problem. During the 1954 debate on extending the bonus pay to veterinarians several Senators objected that "such persons as engineers, for example" have not been accorded comparable treatment, or that "engineers in electronics, and men in other technical fields require the same training (and that) by correcting one alleged inequity would not the bill create more inequities?"

The problem as discussed above involves politics, traditions and professional rivalries. The implementation of the proposed plan would present many administrative and organizational headaches. Whether or not a serious effort is made along this line, it is certain that there will continue to be increasing demands for some action to place professional engineers in the military on a par with the other learned professions.

Editor's Note—The three papers presented here were given at a conference in conjunction with the recent annual meeting of the National Society of Professional Engineers. The conference on education was held simultaneously with conferences devoted to problems of professional engineers in government, industry, and private practice. Each session featured leading figures from the engineering field involved.

These papers from the conference on education are the last of the series to be presented by the AMERICAN ENGINEER.

A Symposium . . .

TEACHING PROFESSIONAL CONCEPTS IN OUR ENGINEERING SCHOOLS

NEED FOR PROFESSIONAL ATTITUDES AFTER GRADUATION

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Need For Professional Attitudes After Graduation

By Leland S. Hobson, P.E.

The Author . . .

Mr. Hobson

Leland S. Hobson, P.E., is professor and associate director, Engineering Experiment Station, Kansas State College, Manhattan, Kansas. He received a B.S. in electrical engineering from Kansas State in 1927. Since 1946 he has been a professor engaged in industrial management engineering at Kansas State and has also been associate director of the Engineering Experiment Station since 1952. He was previously associated with the General Electric Company.

Professor Hobson has held various offices in the Kansas Engineering Society and has for three years been chairman of the Public Relations and Engineers' Week Committee for KSPE. He has been elected to Sigma Tau, Sigma Xi and Phi Kappa Phi, is a past president of the Kansas City Chapter of the Society for the Advancement of Management, and is a member of the American Society for Engineering Education.

THE Young Engineers Committee of the National Society has been very interested in this subject which has been assigned to me, "Need for Professional Attitudes After Graduation." We feel it is an important subject and our colleges, our engineering societies and our industries need to give it more attention.

Most engineering schools find that crowded curriculums make it difficult to give the attention to professional attitudes that they should. Valuable assistance from the Engineers' Council for Professional Development has helped many schools to make good use of the time that is available. Certainly engineering faculties would like to give more attention to professional training, but none of them that I know of put the time or emphasis on professional attitudes and professional ethics that is customary for medical schools or law schools.

It was very interesting for me to learn that in medical schools and in law schools professional attitudes and professional ethics are considered of prime importance and are given a great deal of attention and time. At a prominent medical school where I made inquiry, I found that there is no single course of training in the professional aspects of the doctors' work, but that the subjects of professional attitude and professional ethics are given continual attention in all of the courses and by all of the teachers.

The young medical doctor is introduced to his first patient, is called a doctor and is taken into consultation by his superiors even before he graduates from medical school. This has been called to the attention of our Kansas Engineering Society on numerous occasions by the Kansas Society's past president, Dr. Reed Morse. Dr. Morse points out the professional respect that the older medical doctors

give to young doctors and he says that older engineers show much less professional respect toward EIT's and young professional engineers. Certainly we cannot expect the young engineer to maintain a good professional attitude the first few years after graduation if we fail to treat him with professional respect.

Whether or not these professional attitudes which will be needed after graduation can be effectively taught in an engineering course might be debated. It just happens that at my own institution a one hour credit course in professional development was introduced nine years ago. The course is required for all senior mechanical engineers. The students cover a great deal of ground in many of the subjects dealing with professional development, including the engineer's place in society, engineering organizations, ethical practices and those things which contribute to the growth and development of the engineering profession. Professor Lynn Helander, the department head who started the course, the four instructors who have taught this course and also our dean and associate dean all agree that it has been successful in its principle purpose of improving the professional attitude of our engineering students and in increasing their interest in professional things.

Incidentally, this group also agrees that the professional attitude of our own staff members is even more important in developing professional attitudes in the students than the professional development course. It is important, therefore, that we do not overlook the need for proper professional attitudes among college staff members. This should certainly include such things as registration of staff members, the listing of this registration in the college catalog and membership in technical and professional engineering societies. One need here is for better financial support from school administration for staff members to attend and participate in engineering society meetings. Perhaps the building up of a strong educational section in NSPE which can work closely with ASEE and ECPD will help all three to more effectively promote professional training in our engineering colleges and will in the long run help us in building up a better professional attitude among engineers after graduation.

And now that we have taken brief note of a number of things in college that affect professional attitudes after graduation, let us turn our attention to those things that affect it after he is out of college. There are two major determining factors that will principally be involved. One is the company relations where the young engineer is employed and the other is the engineering organization picture that the young engineer is confronted by.

We have all observed that there is a great deal of difference between different companies in their consideration of professional attitudes. Some people I have talked with have told me that management doesn't show as much interest as the colleges and universities in trying to develop professional attitudes in young engineers. For some companies this appears to be a just criticism. On the other hand, some of the more progressive companies are doing outstanding jobs in encouraging the development of professional attitudes among young engineers. And, interestingly enough, this fine tendency doesn't seem to be restricted to any particular size or industrial group. With my meager knowledge and somewhat remote point of view, I would not attempt any close analysis nor do I have any desire to name companies. But in order to make the point, I will refer to the great work which has been done by the speaker of our luncheon meeting this noon in encouraging the development of professional attitudes among young engineers. Through many years Dr. Boring's work in assisting educational institutions and promoting professional development among engineers in industry has been a great help to this cause. This kind of thing cannot help but reflect genuine company interest in the professional attitude of its engineers.

Perhaps the most practical thing we can do here in discussing the different points of view of company management is to give some thought to those things which different companies are doing which affect the situation either favorably or unfavorably.

A good subject to start on is industry's attitude toward registration. It appears that consulting engineering firms usually require registration for full-fledged engineering jobs. They are also quite interested in EIT programs and encourage registration. A top flight consulting firm that I know in the Midwest has all of the registration certificates of their professional engineers displayed on the walls of the lobby of their main office. It is a very impressive thing that others might do well to copy. But in the large manufacturing industries that employ great numbers of engineers, there is a noticeable tendency to hold back on requiring registration of engineers for full-fledged engineering positions.

There is probably some thinking that such a policy would tend to strengthen the professional interest of the engineers who are registered but it might tend to draw a rather sharp line between this group and the sub-engineering groups of drafting and engineering clerical people leaving them more vulnerable to union domination. To such thinking one might counter that the strength of the leadership of present engineering unions doesn't appear to be in the sub-engineering groups. If management continued to give good attention to the sub-professional engineering groups in the same manner that some of them are now doing for their entire engineering group, the sub-professional group would still be in good position. The young engineering graduates from most schools are acquainted with registration laws and why they exist. It should help his feeling of professional pride if he is encouraged to proceed with his engineer-in-training program and to become registered just as soon as it is practical for him to do so.

Probably the most important thing affecting the professional attitude of the young engineer in the first few years after graduation is the individual consideration which he receives from his immediate boss and from his company. And here again different companies vary greatly in their handling of this matter. And here again the consulting engineering firms generally seem to be making a better impression on the young engineers than many of the large industries. Perhaps one reason for this is that the consulting firms by the very nature of their business are more individualistic in making work assignments and in employee responsibility. But some of the large industrial concerns who employ large groups of engineers are also doing a good job in this area. Such things as periodic individual ratings, individual consideration of salary adjustment, regular procedures for talking over personal progress with each employee, recognition of accomplishments in a personal way are just a few of the things that some companies are doing that especially help the young engineer just out of college.

There are many other places where industry is affecting professional attitudes after graduation, but we must hasten on to the matter of engineering organizations and in this complicated picture we include technical societies, professional societies, engineering clubs, unions, and all similar groups. And I cannot help but comment that if this picture looks complicated to us who are somewhat familiar with these many groups, how much more complicated and confusing it must look to the young engineer after graduation.

The organizations that the young engineers are most likely to be acquainted with are, of course, the technical

societies. There is a good chance that he joined one as a student and will continue membership after graduation. If he has been attending a school where there is a student chapter of a member state society of NSPE and he was a member, then he will probably go ahead with EIT, take out a junior membership in NSPE and his professional situation is off to a good start.

But from here on the picture gets very confused with independent engineering clubs, company engineering clubs and such organizations as the Engineers and Scientists of America, American Federation of Technical Engineers, and many others. The pressures to join these various groups are going to vary by company and location, and what the young engineer joins is going to directly affect his professional attitude, not only as a young engineer but for the rest of his life.

One of the new things that I have just recently heard about in this regard is a plan which I understand ESA has made to mail material and establish contact with various social fraternities in different colleges around the country. I believe the official publication of ESA is to be sent regularly to these college fraternities. It seems quite clear that ESA is making a tremendous effort to try to expand their membership and are aiming a concentrated campaign at the engineers in the first few years after graduation.

The American Federation of Technical Engineers AFL-CIO will no doubt also increase their organizational efforts. Certainly they are not going to be standing by while ESA is turning on the heat. I was very interested in a copy of an address by the president of the American Federation of Technical Engineers which a friend of mine in Schenectady was good enough to send me recently. This address, which dealt principally with the union point of view on collective bargaining, made special reference to the young engineer and I think we can expect that an increase in their activities will be aimed primarily at the younger group.

And now we come to the engineering clubs of various kinds. They seem to be especially helpful and interesting to the young engineer the first few years after graduation.

A couple of weeks ago a copy of a letter from one of these engineering clubs came to M. A. Durland, dean of engineering at my school, and he very thoughtfully handed it to me because it illustrates so well the situation in which our young engineers find themselves. This letter was written by the president of the Fort Wayne Association of General Electric Engineers and was addressed to their members. The letter points out that their Association is not affiliated with the Engineers and Scientists of America, and they feel that this situation must be made clear to our colleges. The reason for this letter is another letter which a vice president of the Engineers and Scientists of America addressed to engineering and science students in various social fraternities throughout the country. This letter from ESA names a number of companies which have engineering employment associations and states that "ESA is the national association for these employee groups." There appears to be a big question regarding the accuracy of this ESA statement. No doubt there will be accusations and counter-accusations regarding these letters, and one of the results will be to confuse the young engineering graduates and overcloud the important issues.

However, there are certain important points that our society should gather from this situation and which are very important to this problem of professional attitudes of the engineer after graduation. The first thing is that there are many engineering organizations of one kind or another. To the young engineer coming out of college, this is going to be quite confusing and it is not going to be easy to make clear to him the purposes of each of these organizations.

A second point of importance is that the membership solicitation by these variou organizations will be quite strong and these efforts are going to be concentrated on the young engineers. It should also be noted that in these membership drives the standards for ethics and truth will be quite low for certain groups.

A third point of importance to note here is that constructive work appears to be effective. The fact that a young engineering graduate was so interested in this situation that he took the trouble to write the dean of his engineering school in order to protect the good name of his association of engineers shows the importance young men attach to this kind of thing.

These engineering associations of the Fort Wayne kind will undoubtedly be an aid to the young engineer just coming out of college, but there is one additional thought that should not be overlooked by management people and that is to reflect on what occurred in this country some twenty years ago. At that time plant workers had formed independent employee groups in many plants and these groups usually received good cooperation from management. Then, due to sudden change in the complexion of the Government at Washington, management suddenly found itself thrown out completely as far as cooperation or communication with these group was concerned. Distasteful as it may be to management, it would seem that they should keep in mind that these things just possibly could happen again. Management is usually wise enough to brace itself against possible financial upheavals. It should also brace itself against possible political upheavals. From this point of view it would seem that these engineering clubs which include all levels of engineers may not be depended upon for all time and management would be in much better position if the percentage of registered engineers in these groups was high and the membership in NSPE was high.

And now that we have taken a brief look at some of the factors involved in this rather complex situation, where does the young engineering graduate and his need for professional attitudes stand?

He starts his career in industry without too much professional training, much less than the doctor or the lawyer. He finds that he is not treated as a professional but rather as a beginner. He is confronted with invitations to join a number of different engineering organizations from which he may select one or more. The chances are that he has heard very little about the National Society of Professional Engineers and it may sound to him like just another engineering group along with the technical societies, his company engineering club, the unions and so on. There is only a slight possibility that he realizes that NSPE is the professional engineers' organization that stands solidly behind the professional engineering group and supports only those things that are professional and ethical. We must admit that at present we are not doing too well in placing the NSPE story before the young engineer. It is of paramount importance that these young engineers learn about NSPE and the things it can do for them.

It is the purpose of the new young engineers program to make a radical improvement in this situation. This new program which was adopted at the last directors' meeting is planned to get action started in the chapters of our society for bringing the NSPE story to a maximum number of young engineers. The plan considers that our present young engineering members are in the best position to promote the expansion of interest and membership among the young engineers group. This new plan encourages each chapter to call together their junior engineers and younger professional engineering members into a special group to be called the Young Engineers.

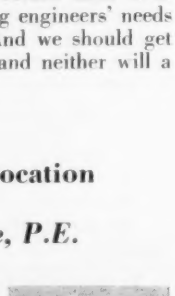
This group has a special program of action suggested to them. They will be responsible for carrying on activities which are of interest to their own group. These activities will include educational courses which they need and desire. The young engineers will arrange for training programs in other fields such as industrial management, supervisory training, labor laws and other appropriate subjects. The young engineers will give special attention to the problems that are facing the young engineering group and recommend to the chapter and on to our state and national societies those policies which will reflect the attitudes and thinking of the young engineers. It will give them a chance to not only participate but to exercise leadership, and they have the support of a strong national professional organization to help them.

But having this plan for young engineers is not enough. What is needed now is action to get the plan in operation. There are just a few chapters that have young engineers programs going. The Ohio Society has had young engineers groups for some time and their high percentage of Junior Engineer membership shows the results. But we need action in every chapter and every state society. To fill this need for action our Young Engineers Committee met in St. Louis last month and worked up a plan of action for chapters and for state societies. It calls for organization of young engineers this year. Every state society and every chapter should study this plan, review their local situation, fit the plan to the local young engineers' needs and get started with their program. And we should get started now. Time waits for no man, and neither will a young engineer.—***End.***

The Engineers' Convocation

By J. W. Whittemore, P.E.

The Author . . .



Mr. Whittemore

John W. Whittemore, P.E., is dean of the School of Engineering and Architecture, Virginia Polytechnic Institute, Blacksburg, Virginia. He graduated from Iowa State College with a B.S. in ceramic engineering in 1921, and received his professional degree, ceramic engineer, in 1927.

Dean Whittemore was appointed head of department, ceramic engineering, at Louisiana State University in 1928. He has been professor, head, ceramic engineering and associate dean of engineering at V.P.I. since 1943. He is the author of numerous technical bulletins and reports and several articles in journals and magazines. He has served as president of the Ceramic Educational Council and is a member of the Institute of Ceramic Engineers, American Society for Engineering Education, ASTM and American Ceramic Society.

THE Seventh Annual Engineering Conference was held at the Virginia Polytechnic Institute on April 26, 27, and 28, 1956. These conferences were started in 1949 when a group of eight engineering students formed the Association for the Advancement of Engineering. The Association's purpose is first, to promote the advancement of the school of engineering and architecture and the entire student body, and second, to represent the engineering student body in its relationships with the administration of the college. There has been fine cooperation from industry throughout all of the existence of the Association. Industry has been extremely helpful with each of the engineering conferences that have been held.

At noon, April 26, the exhibits were opened to the public. There were forty-seven exhibits by many of the outstanding industries of the country. Sixteen of the exhibitors were industrial firms of Virginia. In addition, all of the departments of the school of engineering and architecture had an exhibit illustrating a phase of their work. The exhibit was opened to the public during Friday and Saturday, and more than 10,000 persons visited the exhibits.

On Friday morning, April 27, a convocation was held in Burruss Hall, opened to the entire student body and faculty. Dr. L. K. Sillcox, honorary vice chairman of the board of The New York Air Brake Company, spoke on "The Social Responsibility of Science." There were more than 2,000 in attendance at this convocation.

During Friday afternoon, each department of the school held a symposium. Outstanding men in the particular field acted as a panel and spoke on certain phases of the particular field of engineering. In most cases, the members of the panel for each of the symposium met prior to Friday and planned out their particular program. They covered such subjects as (1) ethics; (2) what is expected of the young engineer when he goes with industry; (3) training programs, and (4) engineering as a profession. After the panel had completed their program, time was allowed for questions and answers by the students and faculty. In many cases, the symposia, which had started at 1:45 p.m., lasted until after five o'clock. There was a great deal of interest by the students in the various programs. Through the presentations of these industrialists, the students were also informed on the value of continuing their development after graduation. They were told of the advantages of registration as a professional engineer, of continuing interest in their technical society and joining with their fellow engineers in organizations such as the National Society of Professional Engineers. It was interesting to note the emphasis that entered into all of the discussions on the value of professionalism as opposed to unionism for engineers.

There were more than 220 industrialists on the campus for this conference. Thirty of them had brought their wives, and a tea was held for them in the Faculty Center.

A High School Science Fair was held in Randolph Hall on Saturday, April 28, and the more than 1,000 student visitors of the high schools attending this fair visited the exhibits in the War Memorial Hall. It gave an opportunity for these young high school students to visit V.P.I. and see the work of the school of engineering and architecture.

It is believed that this was an outstanding affair for the school of engineering and architecture and one that should establish a very much closer relationship between the school, the student body and industry. The concept of the Engineering Conference is broad in scope and execution, extending from a High School Science Fair on the one hand to nationally known convocation speakers, engineering symposia, industrial exhibits and fellowship on the other. It affords the unique opportunity for businessmen and practicing engineers from Virginia and other states to exchange ideas and ideals with Virginia Tech students and for these visitors to the campus to examine at close range the engineering training that is offered by Virginia Polytechnic Institute.—***End.***

Student Organizations

By Glenn W. Ernsberger

The Author . . .

Mr. Ernsberger

Glenn W. Ernsberger is a student at Ohio Northern University, Ada, Ohio, and president of the OSPE Student Council. He is a member of Nu Theta Kappa, honorary engineering fraternity; ONU student branch of the American Institute of Electrical Engineers; ONU Engineers' Joint Council; Ohio Northern Engineers' Speakers Association; ONU Student Chapter of the Ohio Society of Professional Engineers, and Phi Mu Delta, national social fraternity.

He is a licensed amateur radio operator and pursues photography as one of his hobbies. He expects to be employed after graduation with the Aircraft Equipment Department of the Westinghouse Electric Corporation, Lima, Ohio.

THOSE of you who have tried to teach professional concepts in the classrooms of our engineering schools, I am sure will agree, that it is not an easy job. As a student, on the learning end, I am here to contend that the easiest and most effective way to learn professional concepts is through active participation in a student chapter. In short, by the time I am through talking, I expect every one of you to feel it your duty to establish student chapters of your respective state societies.

In Ohio, there are student chapters of the OSPE now established at eight of our ten engineering colleges. These chapters all have as their purpose ". . . to stimulate professional thinking among engineering students through social contacts, fellowship, and cooperation." This purpose was quoted from the Model Constitution which seven of the eight chapters have now adopted. With this Model Constitution in effect, the student chapters have a unified goal, a concentration of efforts and, of course, a fundamentally sound constitution.

These chapters, on the whole, have very active programs. Their meetings may include discussions on registration, professionalism, unionism, or they may have a motion picture of a professional nature. Some chapters organize joint meetings of all campus engineering organizations. Chapters often invite the OSPE president, the executive secretary or an educational committee member to speak at their meetings. Sometimes a joint meeting is arranged with a parent OSPE chapter for a "get acquainted" session, dinner, or for the purpose of sharing a particularly good program.

Quite often these chapters have an active social life and hold dinners and dances and invite members only or invite the whole school as a public relations function. Intramural sports are also successful "interest raisers" and good publicity devices. The Youngstown University Chapter has baseball caps with OSPE written in big white letters across the front.

Most of the chapters are working out mutually beneficial relations with nearby OSPE chapters by having joint meetings, by sending delegates to each of their meetings, and by letting them know what the student chapter is doing. Likewise, these parent chapters are beginning to form liaison committees to work with the student chapters by sending members to their meetings, by supplying speakers, financial aid, or by helping the students find summer employment.

In the line of publicity, student chapters go "all out." Most chapters have a column in their school paper and try to have their functions published in the local paper. One chapter honors a local "big wheel" by presenting him with life membership in their chapter, as shown in the form of a plaque that he can hang in his office. This presentation is widely publicized and takes place at their largest meeting of the year.

When National Engineers' Week rolls around, the student chapters make sure that everyone on campus knows about it. The Akron University Chapter prints a special Engineers' Week issue of the campus newspaper and takes over the campus for a day.

All of the chapters have membership campaigns and use various methods, such as personal contact, speeches in freshman classes or holding smokers which are followed by a program and refreshments. Some chapters establish a literature table for the use of all students. Posters and announcements are used extensively. A formal initiation of new members along with the presentation of their membership cards is sometimes held at the close of the membership drive.

In Ohio, the student membership card is styled after the NSPE membership card and is identical in shape and general appearance. An attractive four by six foot banner is available to the student chapters and the Ohio State University, Ohio University, and the Ohio Northern University chapters are now using these banners. Membership buttons, pins, or keys can be purchased through a national jeweler.

There is considerable competition among the student chapters to see which can be most outstanding. Each chapter is required to submit what we call a Student Chapter Trophy Report about a month before the annual OSPE convention. These reports are used to determine the most outstanding student chapter. At the annual convention, the winning chapter is awarded a trophy.

Speaking of conventions, the student chapters have their own program in conjunction with the regular convention. Needless to say, students from all over the state get together at the convention and really enjoy a fitting climax to their year's work.

Now you may say, "Sure, you in Ohio have fine student organizations, but are they effective? Do they successfully convey 'professional concepts' into the students' lives?"

To that question, I would say "yes." When an engineering student becomes a member of a student chapter of OSPE, he or she has gained representation in the engineering profession. He can participate in activities with other student organizations on campus, with other student affiliate chapters, and with local professional chapters of NSPE. He can take part in the activities of the local professional chapter, including meetings, field trips, and social events. Because of the nature of the organization, he has also become affiliated with the National Society of Professional Engineers. His dues include a subscription to the official state publication.

Assistance in obtaining employment is available to him through the Ohio Engineering Placement Service. He will undoubtedly make valuable acquaintances with "men in the field," who are people willing to give professional assistance in the planning of careers in engineering.

Student chapter membership also signifies that the engineering student is accepting certain responsibilities toward his profession. As Theodore Roosevelt said, "Every man owes some of his time to the up-building of the profession to which he belongs." Every member is expected to actively participate in the organization. The member is also made aware of the "Canons of Ethics for Engineers" and is expected to live by them.

These privileges and responsibilities in themselves do not make a chapter effective. The conveying of professional concepts is a gradual process. As the member progresses through school, he begins to take a more active interest in the chapter. He gains insight into the problems of the chapter by working on committees, or by being the chairman of a committee. He may be called upon to talk before prospective members to sell engineering as a profession. He begins to understand professional concepts as he participates in discussions on professional matters. He may hold an office in the chapter and thus more fully realize the problems that the engineering profession faces. Before he knows it, he is beginning to think and talk professionalism.

He learns of the state board examination and of the necessary requirements to become a licensed professional engineer. As a student member, he associates with other professional engineers at joint meetings with a local OSPE chapter or at the annual OSPE convention. Gradually he begins to realize how his student chapter is a part of the Ohio Society of Professional Engineers and that the OSPE is a part of the National Society of Professional Engineers along with forty other state societies. He feels as though he is a part of a profession rather than just a member of a student chapter.

Could there be any better preparation of a student for entrance into the engineering profession? In my opinion, a student chapter is the most effective means of presenting professional concepts. Ohio now has over 570 student members and this number is growing every year. Many of these members, upon graduation, take the state board examination and become engineer-in-training members in a local chapter of OSPE. Is it any wonder that Ohio has long held the record for the largest EIT membership?

By now you may say, "Sure this is all wonderful, but how did it start?" I'm glad that you asked, because I'll be very happy to tell you the complete story.

As early as 1939 a professional student chapter was formed at my alma mater, Ohio Northern University. A picture of the chapter members appears in our 1939 Annual. However, this chapter was disbanded due to World War II.

In the spring of 1947 a student chapter appeared at Ohio State University. However, it did not apply for a charter from the OSPE. In the fall of 1947, Ohio University became the first student chapter to receive an OSPE charter. This was largely due to the work of one of their faculty members, George Clark, who later became a president of OSPE. Since then, the OSPE has granted charters to the University of Cincinnati and Ohio State University in 1948; the University of Toledo and the University of Dayton in 1949; and Youngstown University, University of Akron, and Ohio Northern University in 1952. These charters were granted upon the board of trustee's acceptance of the chapter's proposed constitution and gave the student chapter affiliation with the NSPE.

After several chapters had been chartered, the students realized that for this student movement to be successful, there had to be better coordination between chapters and a closer cooperation with the state society. As a result of this thinking, the OSPE Student Council was started in December of 1950 when a petition from the members of these several student chapters was approved by the board of trustees. Now the OSPE Bylaw No. 6 provides that a student council may be organized to function as the coordinating agency of the student chapters in all matters not inconsistent with the purposes and policy of the Ohio Society; and that its organization, rules, regulations, and minutes of meetings must be approved by the board of trustees and kept on file at state headquarters; that a member of the council may sit with the board of trustees; and that an engineer member shall be appointed by the president to serve in a liaison capacity with the council.

Since the formation of the student council, it has grown with its awareness of the student chapter problems and has done much to coordinate student chapter activity. The student council meets monthly during the academic year, and is made up of an elected president, a secretary-treasurer and a maximum of three voting delegates from each student chapter. The council has formed a policy committee, a publications committee, a historical committee, and a new chapter committee for the purpose of doing the work of the council. It was a result of this group that the Model Constitution was drawn up and approved by seven of our eight chapters, and approval by the eighth chapter is expected very shortly. The council was also instrumental in the formation of new chapters and has helped to establish the annual Student Chapter Trophy competition. The council is an important link between the Ohio Society and the student chapters and does much to keep both groups informed of the actions of the other.

The council has as its official publication, a monthly paper called the *Key*. The annual convention issue of the *Key* contains a summary of the year's work and reports from the officers and committee chairmen. Copies of the student council *Key* and the minutes of every meeting are sent to all of the delegates and student chapter officers and also to many interested members of the Ohio Society and to members of some other state societies. The Ohio Society has printed about seven or eight pamphlets and booklets for the use of student chapters. The student council often times writes the original manuscripts for this literature, makes the revisions, and of course sees to it that all student chapters are using it to its best advantage.

For the past two years, the student council has sponsored a presidents' and vice presidents' workshop. This meeting is held after the new chapter officers have been elected and the new and retiring presidents and vice presidents are requested to attend. The attendance at these meetings has been excellent and the discussions have been very helpful. The workshop is intended to give the new officers an orientation and at the same time be a method of ironing out specific student chapter problems. At the 1955 presidents' and vice presidents' workshop, the discussion included such topics as: successful meeting ideas, chapter social activities, membership drive programs, publicity, and relations with local chapters of OSPE.

Thus you can see that the student council plays a large part in assuring that the student chapters are all effective organizations.

In 1954, the board of trustees formed a Student Chapter Committee whose members were drawn from the local OSPE chapters in which student chapters were located. The president of the student council is also a member of this Committee. This group furnished the missing link between student chapters and local chapters and has done much to increase the cooperation between the two. The Committee has assigned each local chapter to a student chapter in their own geographical area, and has suggested that a liaison committee be formed in each local chapter to work with their student chapter. Recently, this Student Chapter Committee has become a part of the OSPE Education Committee. This was done to eliminate any duplication of effort.

During the past few minutes, I have tried to sell you on the idea of student chapters, and on how they are effective in spreading professional concepts in our engineering schools. Then I described the background of the development of student chapters in Ohio. Now I hope you are convinced and ask, "How do we go about starting student

chapters in our own engineering schools?"

Ever since the founding of the OSPE Student Council, the answer to this question has been in preparation. It is in the form of a handbook. The OSPE Student Council is glad to announce that the first edition of this student chapter handbook is now available for your use. The council has tried to include all of the experience that has been gained during the last nine years so that your state societies will have a ready and useful reference available when you form your student chapters. Each of you will receive a copy of this handbook, and I believe it will be well worth your while to carefully read and use it. It is the hope of the council that this handbook will help solve *some* of the problems that you will encounter. Believe me, we haven't solved *all* of them ourselves!

Before actually starting a student chapter, you should make sure that the prospective chapter is to be located in an engineering school approved by your state board of registration. Then you should convince the dean of the engineering college that his school would benefit by having a student chapter of your state society. Let me emphasize this point. It is very important that the dean of the college be squarely behind you. If he doesn't agree with the idea, perhaps he isn't even a member of your local chapter. If that is the case, get him interested by inviting him to your meetings and obtaining his membership. When you have the dean on your side, you have half the battle won. Through him you can talk with engineering students and arouse their interest. Then appoint or elect officers and draw up a constitution. Here, Ohio's Model Constitution should be helpful. Now you are in a position to request a charter from your board of trustees. The student council and the OSPE will be more than glad to help you in any way they can.

Remember, by starting student chapters, you will not only be helping your state society; you will be building a strong engineering profession for tomorrow. In the words of our John Coleman, past president of NSPE, we of the student council, " . . . take off our hats to the past and our coats to the future."—***End.***

Additional Comments From the Floor

It is with some hesitation that I make these remarks. The fact that one hesitates to make such remarks probably indicates a need for thoughtful consideration of them. While I agree that college courses in engineering dealing with professional attitudes and student societies of NSPE will make a contribution to professional growth, I think we should realize that the foundations are to be found in the spiritual or religious training of the individual. We would be misleading if we did not emphasize that professional ideals are rooted in the basic teaching of the great religions of the world. I think it would be well if the NSPE would state their views on this matter if they expect to develop the best professional attitudes in future engineers.

Again I say I hesitated to make these remarks since there has been enough religious bigotry to cast some suspicion on comments of the kind I have made.

—Clark A. Dunn, P.E.
Oklahoma Institute of Technology of the
Oklahoma Agricultural and Mechanical College,
Division of Engineering Research, Stillwater, Okla.

* * * *

The three papers presented before this session of the annual meeting make it clear that engineering faculties and the chapters of the Society around the country are actively endeavoring to acquaint student engineers across the country with professional registration and the ethics of professional practice. The program at Rutgers, like that at VPI, is aimed at teaching every student what registration means to him and at giving him the widest personal contact with the professional engineers in the vicinity of the college. The dean's lecture series for the senior class each spring is a series of six lectures devoted to registration, professional ethics, social responsibility, etc. National Engineers' Week is celebrated at the College of Engineering with an Engineering Open House, an occasion on which the general public is invited to tour the engineering laboratories and the associated student displays. Local engineering and industrial firms are invited to set up displays of a character likely to interest an engineering student, the high school student visitor, and the public at large.

At the student level, the Engineering Societies Council, with representation from each of eight student chapters of the founder societies, deals with those areas of student interest that are nontechnical, inter-society, or professional in character. The council each year conducts a series of meetings at which a campus or professional speaker, invited by the council, speaks on a general topic of current interest.

Another related activity is really a chapter activity. Rutgers is blessed with the active interest and support of the Raritan Valley Chapter of NJSPE. Each spring one of the chapter meetings is designated "Student Night" and the senior engineering students are invited as guests of the Chapter. A member of the faculty, who is also a member of the Chapter, plans the program. The cooperation that the college receives from the Raritan Valley Chapter and from the New Jersey Society extends into many other areas of mutual interest and I would be remiss if I let this occasion pass without publicly acknowledging our indebtedness to them.

Several implications of the papers presented here warrant thoughtful study and discussion. In Professor Hobson's paper he remarks that "if he (a student) has been attending a school where there is a student chapter of the NSPE and he was a member, then he will probably go ahead with EIT, take out a junior membership in NSPE and his professional situation is off to a good start." He seems to say, by direction, that the student who attends a school that *does not* have a student chapter of NSPE, probably will *not* go ahead with EIT and will probably *not* take out a junior membership in NSPE and his professional career is off to a bad start. I am sure that Professor Hobson meant to suggest no such want-of-a-nail inevitability. I call attention to it here to point up the fact that we cannot tacitly assume that the existence of a student chapter at every engineering college is a "must." An attempt to organize a student chapter at every college would be a mistake—the mistake of an inflexible approach. In many situations, other avenues of approach to the students will be very much more effective.

If the faculty and students of a particular college want to establish a student chapter of NSPE, then the cooperation, guidance, and assistance of the state society and the local chapter can be of material help. But there are many engineering colleges that are over-organized with student societies. In such instances, scheduling of chapter meetings to avoid conflicts becomes impossible, attendance at meetings is poor, the planning and execution of programs falls on the shoulders of a limited number of students, and the effectiveness of all programs suffer. The difficulties are intensified on metropolitan campuses where a sizeable percentage of the students commute to and from their homes each day. Student meetings on such campuses must necessarily be crowded into the hours of the school day.

Moreover, as Dean Whittemore has pointed out in his paper, there is a fundamental difference of viewpoint between "the value of professionalism as opposed to unionism for engineers." Colleges that permit the establishment of student chapters of NSPE as the principal medium for bringing its engineering students into a close working relationship with an organization like ours may find themselves under very heavy pressure from other national organizations to permit the establishment of student chapters which would have as their purpose the bringing of engineering students into close working relationship with the movement for the unionization of engineers.

My own view is that the professionalism movement can find other methods for acquainting students with the registration movement without making the college campus the battleground between these basically conflicting attitudes.

One method that is being employed in some states, I understand, is the practice of the registration board to give the EIT examination at the college shortly before graduation. By this means the registration boards capitalize on the close personal ties among engineering students, built up over four years of college, to draw in all students as a natural group. After graduation, the seniors disperse over wide geographic areas and into jobs where they are confronted by a variety of employer attitudes, as Professor Hobson has indicated. But the student who successfully completes the EIT exam before leaving college will have the motivation of completing his registration that will cause him to learn the further steps in the registration procedure in the state where his job takes him.

There must be other ways in which the state societies can render effective service in guiding young engineers toward registration. All such ways should be carefully explored. The present shortage of engineers, coupled with the interruption of military service, makes for a highly fluid movement of young engineers today. The efforts of the National Society and its chapters will be far more effective if it accepts the responsibility for finding the young engineer on his first job and facilitating his steps toward registration (particularly with wider inter-state reciprocity) than if it relies on indoctrination during his student days to carry him through the crucial formative years of professional practice.

—W. Brewster Snow, P.E.
Rutgers University.
New Brunswick, N.J.

WHAT has been suggested by the three speakers is good. One can readily appreciate that the engineering conferences described by Dean Whittemore and sponsored by the Virginia Polytechnic Institute would promote closer relationships between the college, the student body, industry, and the professional engineer. Furthermore, it has been our experience as well as VPI's, that Science Fairs stimulate interest on the part of high school students in science and engineering.

Mr. Ernsberger's description of the activities of the student chapters of the Ohio Society of Professional Engineers was excellently presented. Participation in these student chapters by a student would probably result in a greater sensitivity to his professional responsibility. However, a word of caution seems to be in order with respect to too widely dispersing the students' limited time. Engineering college students do not have much free time and what they do have available already seems to be more than accounted for by the existing organizations, including student chapters of the engineering societies.

Professor Hobson's discussion of the need for professional attitudes after graduation was most excellent, and one cannot but help to agree with his urging that the older engineers show greater respect for the young EIT's. He made many telling points with respect to how the professional attitude after graduation is affected by company relationships and engineering organizational practices.

There are just one or two points which I should like to make with respect to the teaching of professional concepts. First, I feel that professional concepts can best be taught if the individual teacher exhibits professional attitudes through practicing what he preaches. He will accomplish much more in teaching professional concepts if the teacher himself will live up to the high ethical standards of the profession, perform at a high level, give full value in his classes, participate in civic activities, and in general, maintain a relationship with his students paralleling that existing between a professional engineer and his clients.

In concluding my remarks, I cannot help but comment on what we feel has been a very successful four-year program devoted, to a great extent, to sensitizing the engineering student to his professional responsibilities. Time does not permit mentioning all of the topics and speakers, but among them have been men like Bill Dean, Merton Adams, Herbert Taylor, Charlie Dodge, and others of the New Jersey Society of Professional Engineers who have given freely of their time and experience in speaking to student groups. There have also been lectures by Dr. Allan R. Cullimore, president emeritus of the college, and others, at which topics such as "The Character and Range of the Profession," "Social and Economic Responsibilities of the Profession," "Aesthetic and Spiritual Values of the Profession," "Professional Conscoiusness," and other topics have been discussed. In addition, we have made rather extensive use of panel discussions, bringing to the panel leading industrialists, engineers, professional men and others to discuss topics such as licensing, labor-management, ethics, the engineer's duty as a citizen, and the "Unwritten Laws of Engineering" by King. We feel that these classroom programs and faculty relationships have been extremely successful in bringing the professional concept of engineering to our students.

—Robert W. Van Houten
President, Newark College of Engineering
Newark, N. J.

N.S.P.E. Believes

THE CHALLENGE OF IGNORANCE

BY PAUL H. ROBBINS, P.E.

Executive Director

N.S.P.E.

A RECENT study by Purdue University of the impressions of over 15,000 teen-agers with respect to their reactions to professions in science and engineering is indeed most disturbing. This survey, for example, indicated

Forty-five per cent believe their school background is too poor to permit them to choose science as a career.

Thirty-five per cent believe that it is necessary to be a genius to become a good scientist.

Thirty per cent believe that one cannot raise a normal family and be a scientist at the same time.

Twenty-eight per cent do not believe scientists have time to enjoy life.

Twenty-seven per cent think that scientists are willing to sacrifice the welfare of others to further their own interests.

Twenty-five per cent think scientists as a group are more than a little bid "odd."

Fourteen per cent think there is something "evil" about scientists.

Nine per cent believe that you cannot be a scientist and be honest.

It goes without saying that practically every scientist and engineer feels that none of these attitudes correctly reflect his profession. While this study does not attempt to analyze what has generated these attitudes on the part of teen-agers, it is a sobering thought to the professional engineer that these attitudes should exist at a time when all thinking men and women recognize the serious challenge to our way of life by the requirements for wise and thoughtful applications of our scientific knowledge. When it is essential that we encourage all capable young people to seek careers in science and engineering, when the future offers such a challenging opportunity for using science and engineering for the good of mankind, the profession must take serious stock of ways and means by which these impressions may be corrected.

What then might be the cause of these attitudes, and what can professional societies such as NSPE do about them? One, it is apparent that past expressions of the role of the scientist and engineer have been grossly misleading. There have been too many radio and TV programs and too many comics where the role of the engineer or scientist has been an evil or maladjusted individual.

Second, it is apparent, certainly from the standpoint of the engineering profession, that we have too long hidden our light under a bushel. It is disturbing, for example, to find on a parallel survey by students at Ohio State University that eighty-four per cent of teen-agers interviewed could not name an outstanding engineer, and that few were personally acquainted with a professional engineer. With engineering perhaps the second largest profession in the United States, it is probably conceivable that there was at least one professional engineer living in the same block as every one of the teen-agers queried. It appears that as engineers we have been too willing to let our works speak for our profession, rather than endeavoring to impress upon the public's mind that the great engineering feats of our time have been accomplished because of the skilled brainpower and experience of professional engineers and scientists. The challenge to us is evident.

As a profession, we have great need of public relations—public relations in terms of acquainting the public with the works of engineers; public relations of associating engineers as individuals with their works; public relations within the profession to have its members stand up and be counted; public relations with young people to acquaint them with the rewarding experiences of engineering as a career.

NSPE has believed this to be a major activity in which it should be concerned. It has some notable achievements in this direction as, for example, Engineers' Week, the work of its chapter people in appearing before groups and the like, the vocational guidance activities with high school students, etc.

Let us sincerely hope that a similar poll taken five years hence will show an appreciable change in these attitudes among teen-agers, and let's resolve that professional engineers through their professional society and as individuals will bend every effort to meet the challenge of ignorance.—***End.***

With Our Members . . .

Robbins Represents Engineers

Speakers Discuss Professionalism At District of Columbia SPE Meeting

The meaning of professionalism was discussed at the September meeting of the District of Columbia SPE. Three well-known speakers presented the points of view for professional engineers, lawyers, and doctors.

Paul H. Robbins, NSPE executive director, stated that a professional engineer enjoys status both legally and socially. Professional status is earned through education, knowledge, experience, and moral responsibility, he asserted. Mr. Robbins said that engineers differ from other professions by—(1) being employed for the most part, (2) being represented by a large number of separate technical societies, and (3) a reluctance to go the second mile on behalf of their profession and their community. Despite these differences, however, he pointed to progress being made by the profession in developing professional stature.

The Honorable Robert E. Freer, past national president of the Federal Bar Association and long-time chairman of the Federal Trade Commission, gave a brief history of professional law associations both in England and in this country. He said lawyers are required to take an oath as officers of the court and to uphold justice in all their professional undertakings. He showed how bar associations serve the community through free legal service to indigents, through a legal aid service, and through individual service on community projects.

Dr. Herbert Ramsey, noted surgeon and gynecologist, and past president of the Medical Society of the District of Columbia, recalled the problems of the Society through its 150 years of history. He advised engineers that public recognition and status for either a professional society or its members can be gained only through genuine service to the public. He indicated that engineers will learn ultimately from experience that professional standing cannot be earned through selfish objectives such as those held by trade unionism.

Blacksburg Chapter Officers

James H. Lillard, (right front) retiring president of the Blacksburg Chapter of the Virginia Society of Professional Engineers, passes the president's gavel to his successor James H. Sword, Blacksburg. Looking on are the other new officers of the organization, l. to r.: Ralph V. Ott, Narrows, first vice president; Daniel Frederick, Blacksburg, second vice president; James A. Waller, Blacksburg, secretary-treasurer; Herman O. Arendsee, Pearisburg, director. Another director, Harry A. Wall, Canbria, was unable to be present.

C&O Railway Coal Development Discussed

The Appalachian Chapter of the West Virginia SPE met recently in the Glass House near Beckley, W. Va., and heard Fred J. Toothman, mining engineer, discuss coal development of the Chesapeake & Ohio Railway.

Tentative plans for the next meeting of the Chapter is with the Army engineers located at Camp Prince, W. Va., according to Lloyd G. Fitzgerald, president.

Better Business Bureau General Manager Speaks On "The Age of Chiselry"

Verner S. Gaggin, general manager of the Better Business Bureau of Philadelphia, gave an enlightening talk to some 200 members of the Philadelphia Chapter of the Pennsylvania SPE at their first meeting of the current season. Mr. Gaggin traced the rise of the Better Business Bureau from their first "Vigilance Committee" organized years ago to fight fraud and misrepresentation in advertisement, to the present organization consisting of approximately 113 Better Business Bureaus throughout principal cities in the United States and Canada.

Using "The Age of Chiselry" as the title for his talk, Mr. Gaggin gave several examples of fraud and misrepresentation, both intentional and unintentional, citing the war surplus incidents, the furnace repair racket, the mystery tune programs, and other "get something for nothing programs."

Mr. Gaggin's advice to engineers who plan to do business with concerns whom they have not had any previous dealings, and about whom they are skeptical, is to check with the Better Business Bureau in their city regarding the method of operation of the concern in question.

The Bureau has a complete registry of about every business listed in the particular areas where they have jurisdiction, he said.

While the Better Business Bureaus themselves cannot impose fines or force business concerns to stop misrepresentation, Mr. Gaggin said, they can, nevertheless, bring pressure to bear which generally receives the same results.

Wisconsin SPE Holds Ninth Annual Workshop

Talks by Charles D. Curran, former executive director of the Hoover Commission Task Force, and Harold L. Goodwin, consultant to the Federal Civil Defense Administrator on Special Weapons Effects, highlighted the ninth summer conference and workshop of the Wisconsin SPE held recently in Genoa City.

The three-day session included functional and business group meetings. Art Behling, State president, presided at the business meetings.

Guided Missles Projects To Cost U. S. Two Billion

A total of two billion dollars will be spent by the United States in 1957 on major guided missile projects, L. F. Megow of Houston told the Piney Woods Chapter of the Texas SPE at a recent ladies night meeting.

Mr. Megow, general manager of Hahn and Clay Fabricating Division in Houston, explained the theory behind guided missiles and progress to date in their study and construction. He was aided in his discussion by four members of the Rocket Research and Development Society, a group of young Houston amateur rocket enthusiasts.

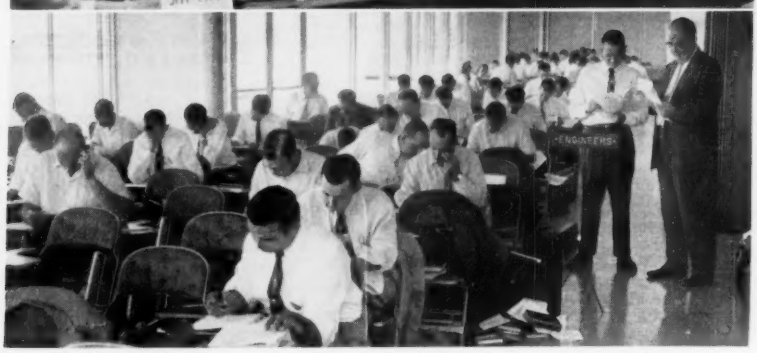
The talk was followed by a question and answer session.

Mass. SPE Opens Season With Dinner Meeting

A dinner meeting in Danvers opened the 1956-57 season for the North Shore Chapter of the Massachusetts SPE.

William F. Dewey, partner of the firm of Anderson-Nichols & Company and in charge of their Architectural and Engineering Division, was guest speaker. He spoke on the development of the Texas Tower, which represents a link in the radar defense of the New England coast. A motion picture illustrated the final stages in the building of the first of the five towers plus its placement at sea, and the effect of hurricanes and storms to which it has been subjected.

Happenings In Missouri



Upper photo: Among those participating in a recent meeting of the board of directors of the Missouri State Society were, l. to r.: Mrs. Natalie Carson, Jefferson City, office secretary; Paul N. Doll, Jefferson City, executive secretary; J. Kent Roberts, Rolla, treasurer; A. C. Kirkwood, Kansas City, president; H. W. Honefenger, St. Louis, president-elect; H. O. Croft, Columbia, vice president, and D. L. Robinson, Jefferson City, secretary.

Lower photo: The largest group in the history of the Missouri State Board of Registration for Architects and Professional Engineers took examinations in October. About 400 applicants appeared before the Board either for oral or written exams. A. C. Kirkwood, president of the Missouri SPE, is shown helping with the monitoring during the P.E. examinations. His son, Bev, was among those taking the exam. Other MSPE officers also aided in the monitoring.

By Mrs. Warner Howe, Chairman of the Ladies Auxiliaries Advisory Committee.

Professional engineer wives who were able to attend the NSPE fall meeting, October 25-26, at the Greenbrier Hotel, White Sulphur Springs, West Virginia, have added to their memories another pleasant and fruitful event of the NSPE. Mrs. Harry G. Kennedy, chairman of the ladies' program, wrote as early as the fifth of October that the advance registration of professional engineers and especially of their wives was "most gratifying." The newly organized Charleston, West Virginia, Auxiliary was active in making this fall meeting a success. Prior to the NSPE fall meeting, this Auxiliary enjoyed a family picnic with an attendance of 132 adults and too many youngsters to count.

The Woman's Auxiliary of the Texas Society of Professional Engineers held an unusual event in September which resulted in fun and fellowship for their members and an excellent news story and picture in the Dallas *Times Herald*. (Good publicity on professional engineers' auxiliaries helps arouse the interest of the public in the professional engineer and his society.) An "Alphabet Luncheon" was served under the trees on the lawn of the Frank W. Chappell home, 4419 Cole, Dallas, Texas. Each of the ninety Auxiliary members invited brought a vegetable dish or salad beginning with the initial of her last name.

For their November meeting, "Wives of Professional Engineers," Erie, Pennsylvania, have asked their husbands to join them at a tureen dinner and to hear David Parmenter, civil defense director, speak on "Atomic Fall-out." Busy days are ahead for this Auxiliary as they join

(*Continued on page* 46)

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Restricted to Registered Professional Engineers . . . Directory Continued on Next Page

Present Engineer Forum To High School Students

The Broome Area Chapter of the New York State SPE recently presented a forum on the subject of professional engineering as a career for high school students at Roberson Memorial Center.

The forum was the second in a series of twenty-four weekly meetings, embracing a wide variety of occupations, in Roberson's Vocational Information Program.

Thomas L. Black, General Electric Co., served as moderator for the panel of engineers which included: William H. McFarland, head of a Binghamton engineering firm; Edmund A. Barber, International Business Machines Corp.; Arnold R. Milliken, vice president and general manager, New York State Electric & Gas Corp., and Donald R. Webb, General Electric Co.

Engineers on the forum planning committee were: Chairman Charles S. Ingwall, Ansco; William W. Wilson of the McFarland firm; Lloyd D. Armstrong, IBM; Henry J. Hajko, IBM, and Mr. Black.

The Piedmont Chapter of the South Carolina Society of Professional Engineers recently held their fall meeting in Greenville, S. C. The meeting featured the installation of new officers for the current administrative year. They are, l. to r.: J. Leon Gabrels, secretary; Thomas P. Grimball, Jr., president, and W. Robert Wade, vice president.

New Alcoa Building Construction Described

Robert E. Paterson, Aluminum Company of America, spoke on the construction and erection of Alcoa's new office building in Pittsburgh at the October meeting of the Albany County Chapter of the New York State SPE.

Supplementing his talk with motion pictures, Mr. Paterson followed the early ground-breaking to completed building.

Engineering As A Career Subject At Nueces Chapter

"Why Select Engineering as a Career?"

This was the subject of a speech by John Hill Watts, Jr., of Westinghouse Electric Corporation, at the October meeting of the Nueces Chapter of the Texas SPE.

Mr. Watts has been manager of Westinghouse's Corpus Christi office since 1945.

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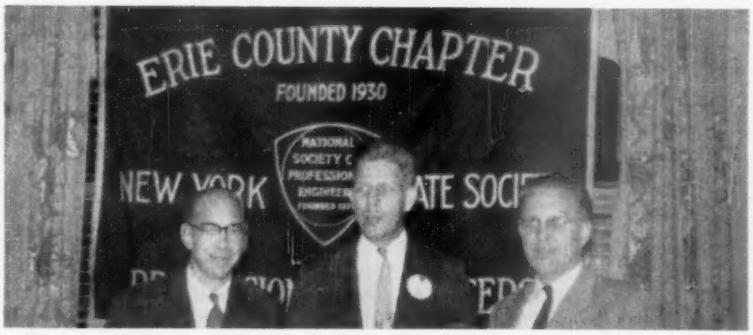
"Flying Saucers—Fact or Fancy?" Asks GE Speaker

At a recent meeting of the Valley Forge Chapter of the Pennsylvania SPE, Dr. Hugh Winn, General Electric Company, Philadelphia, Pa., gave an interesting talk to about seventy members and guests on the subject—"Flying Saucers—Fact or Fancy?"

Dr. Winn, who works in the Special Defense Projects Department, opened his talk with a reminder that we have five normal senses, illustrating each with an example. From this he brought out the fact that some times our senses lead us to illusions—or thinking that something is—that isn't. He gave examples of instances where a person had reported seeing objects flying through space, but which could not be authenticated by other individuals.

Dr. Winn told of flying objects that have been seen with the aid of scientific instruments, such as radar and the camera. The saucer-type objects which were seen for about five hours over Washington, D. C., in 1952 were judged by radar to be flying from 250 to 7,500 miles per hour, he said. On other occasions cigar-shaped objects with estimated speeds up to 21,000 miles per hour were reported. The saucer objects appeared to give off a bluish glow, Dr. Winn stated.

There have been numerous written accounts of objects seen in the sky during the past 2,000 years, he said, and maybe flying objects are not new.



Shown at a dinner meeting of the Erie County Chapter of the New York State SPE are, l. to r.: Floyd Eckhardt, chief engineer of the Lackawanna Steel Plant of the Bethlehem Steel Company; Earl A. Schilt, chapter president, and T. O. Zittel, co-chairman of the meeting. The engineers toured the steel plant prior to the dinner. Mr. Eckhardt spoke at the meeting.

Engineering Challenge Topic At N. Y. Chapter

"The Supreme Challenge to the Engineering Profession" was the topic under discussion at the October meeting of the Central New York Chapter of the New York State SPE.

Speaker for the session was George H. Shay, staff manager of the Government Department, Johns-Manville Sales Corporation, New York City. He talked about the responsibilities of the engineer in his acceptance of the role of a responsible, active citizen in the modern world.

The November 13 meeting has been designated as "Young Engineers' Nite."

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Auxiliaries

(*Continued from page 41*)

their husbands in making plans for the Pennsylvania SPE State Convention to be held in Erie in May, 1957. Mrs. Charles Weislogel, president of the "Wives," has appointed Mrs. Hugh M. Nelson convention chairman in charge of ladies' activities. Mrs. Nelson will appoint auxiliary members to assist the various men's committees in making over-all plans for the convention. This Auxiliary already renders valuable service to their husbands: the women call members of the Erie Chapter for their reservations for the Chapter's monthly meetings. This procedure has not only saved the Chapter money but also resulted in a considerable increase in monthly attendance.

From The Tides Inn, Irvington, Virginia, where he was vacationing with his family, Don Peters, chairman of the NSPE Chapter Activities Committee, wrote early in October that the Ladies Auxiliaries Committee should proceed with plans to secure an effective ladies auxiliary insignia for suggested use by auxiliaries. All auxiliaries are requested to send their suggestion for such an insignia to their area chairman. From the submitted insignia, the Ladies Auxiliaries Advisory Committee will select several to be presented for final choice by all present at the Ladies Auxiliaries Meeting of the 1957 NSPE annual meeting in Dallas, Tex.

Minutes of the auxiliaries' meeting in Atlantic City and copies of *Engineers' Wives* have been mailed to all known auxiliary presidents. If your organization has not received these, please, send the name of your auxiliary and its officers' names to Mrs. Warner Howe, 344 Josephine Street, Memphis 11, Tennessee, and to your area chairman. (These chairmen are listed on page 44, October issue, *American Engineer*).

The Ladies Auxiliary of the South Piedmont Chapter of the North Carolina SPE held an outdoor meeting in September at the home of Mrs. John Bolen. Members bring sandwiches and the hostess provides coffee and dessert at the meetings, which are held at the homes of the various members. A White Elephant sale took place at the October meeting at the home of Mrs. Earl Embree. The money derived from the sale will be applied to an engineering scholarship fund which is administered by North Carolina State College. The engineering student receiving the scholarship will be selected from the Piedmont area.

STRICTLY BUSINESS

Personalities . . . **Dudley F. Phelps** has been elected vice president in charge of engineering and chief executive officer of **The J. G. White Engineering Corporation.** . . . **The Dravo Corporation,** Pittsburgh, Pa., has announced the appointments of **C. R. Horton** as chief marine engineer of the Engineering Works Division; **William W. Hamilton,** research engineer for the Research and Development Department, and **Donald A. Booth,** chief draftsman of the Engineering Works Division. . . . **Abbot Kinney** of **Logistics Research** has been named applications engineer in charge of the firm's New York Branch. . . . **Willy A. Fiedler** has been appointed to the engineering staff of the **Lockheed Missile System Division,** Van Nuys, Calif. . . . The appointment of **Ralph A. Lamm** as director of engineering, Pacific Division, **Bendix Aviation Corporation,** has been announced by division general manager **R. C. Fuller.** . . . **Robert C. Shoemaker** has been promoted to the position of supervising engineer, Patents and Products Analysis, of the **Hyster Company,** Portland, Ore., according to **Al Zwald,** chief engineer. . . . **Lux Clock Manufacturing Company,** Waterbury, Conn., has announced the appointment of **Dwight E. Harris** as chief engineer and head of the company's recently expanded development and product application departments.

Mr. Phelps

Three personnel changes have been announced in the engineering department of **Jones & Laughlin Steel Corporation,** Pittsburgh, Pa. **D. H. Miller** has been promoted to planning and development engineer; **R. W. Barnitz** has been named chief electrical engineer, and **Stephen Vajda** has been appointed special engineer. . . . **R. L. Cardinell** has joined the acoustical engineering firm of **Lewis S. Goodfriend,** Scarsdale, N. Y. . . . The board of directors of **Penn-Plastic Corporation,** Glenside, Pa., has elected **Charles W. Kleiderer** as executive vice president of the corporation and its subsidiary **Penn-Plastic Manufacturing Company.** . . . The **Universal Builders Supply Company, Inc.,** New York City, announces that **Robert D. Duggan** has joined their Engineering Department. . . . **Edward C. Peterson** has been elected vice president, Rolling Mill Equipment Division at the **Birdsboro Steel Foundry & Machine Company,** Birdsboro, Pa. . . . **George R. Halton** has been appointed head of the Highway and Airport Division of **The Kuljian Corporation,** engineers and constructors in Philadelphia, Pa. . . . The appointment of **Karl D. Swartzel** as chief research and development engineer of the Guided Missiles Division of **Republic Aviation Corporation,** Farmingdale, N. Y., has been announced by **Robert G. Melrose,** general manager of the division.

Mr. Peterson

Robert F. Gilman has been named production engineer by the **Brooks Rotameter Company,** Lansdale, Pa. . . . **American Oil Company,** New York, N. Y., announces the promotion of **Robert O. Brown** to manager of engineering and construction for the Marketing Department. . . . The appointment of **Christian F. Gort** to the new position of plant engineer for its aviation division in Phoenix, Ariz., has been announced by the **Sperry Rand Corporation.** . . . **P. H. Neville,** president of the **Leece-Neville Company,** Cleveland, Ohio, announces the appointment of **Homer C. Hueffred** as manager of the Industrial Engineering Department. . . . **Intrusion-Prepakt, Inc.,** Cleveland, Ohio, has named **Harrison H. Roberts** as manager of engineering and foreign operations. . . . **Kenneth M. Adelstein** has been named chief engineer, Public Works Department, U. S. Naval Mine Depot, Yorktown, Va.

Operational Expansion . . . **Plumb, Tuckett & Pikarsky,** consulting engineers, Gary, Ind., have announced the addition of several new men to their staff and the opening of a new branch office in Chicago, Ill. **Milton Pikarsky** will be in charge of the new office, and **Ernest R. Seymour** will be transferred to Chicago. Additions to the firm include **Douglas M. Ward, Robert C. Book,** and **Robert D. Reeise,** draftsmen, and **Benjamin Hernandez** and **Hilary J. Nakielski,** designers. . . . **B. M. Johnson,** vice president, Refractories Division of **The Carborundum Company,** Perth Amboy, N. J., has announced several organizational changes. **C. P. Clapp** assumes the newly created position of manager of manufacturing, and **Jack S. Gaynor** has been appointed to the post of manager of manufacturing engineering. . . . **Luria Engineering Company** has opened a new district office in Pittsburgh, Pa., and has appointed **Eric N. Dittig** as its manager.

Mr. Clapp

Organizational Meeting . . . The **Metal Building Manufacturers' Association** recently elected **W. B. Larkin** of the **Butler Manufacturing Company** as chairman of the board of directors. **D. H. Malcolm** of the **Armco Drainage & Metal Products Company** was elected vice chairman, and **Hunter-Thomas, Associates,** of Cleveland, Ohio, were selected as general managers. Charter members of the Association are: **Armco Drainage & Metal Products Co.; Behlen Manufacturing Co.; Butler Manufacturing Co.; Carew Steel Co.; Cowin & Co., Inc.; Inland Steel Products; Martin Steel Buildings, Inc.; Metallic Building Co.; Pasco Steel Corp.; Soule Steel Co.; Steelcraft Manufacturing Co.; Stran-Steel Corp.,** and **Wonder Building Corp. of America.**

New Firms . . . **Victor D. Macomber** and **Fred S. Faber** announce the formation of a partnership as consulting engineers with offices in Harrisburg, Pa. . . . **Roy J. Elam** and **Clarence J. Sikorski** have announced the establishment of the consulting engineering firm, **The Charles Company,** Paterson, N. J.

What's New

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Semi-private office units can be created from open floor space in matter of minutes with Hauserman Divider Wall partition. Of precision steel and glass construction, the new divider wall integrates perfectly with all other types of Hauserman walls. It features instant, snap-in panels, quick-setting leveling devices on legs, concealed wiring channel, life-time baked enamel finish, and special, new-type plastic glazing strips for inserting and removing glass panels without danger of chipping or breakage.

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PLASTIC LACQUER FOR FIBREGLASS — Item 2

New lustre for weather-dulled fibreglass-plastic panels is promised by a plastic lacquer just introduced by the Resolite Corp. Called *Resolac*, this air-drying liquid lacquer, when applied directly to the surface of fibreglass-reinforced plastic panels is said to restore most of the original lustre and finish, dulled or roughened by long exposure. May be used to deepen color, reduce light and heat transmission. Applied with a low-pressure spray gun or paint brush. Available in clear and seven colors.

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FILMSORT READER DOUBLES AS PRINTER — Item 4

A new microfilm reader, which will also make large prints simply by direct projection of the film image on to photocopying paper, is announced by the Filmsort Division of Dexter Folder Co. Known as the Examiner, 30" high, 17" x 17", the new unit will be the largest of the desk-top models in the Filmsort line. 14" x 14" viewing and printing screen makes the Examiner suitable for legal, banking, title search, etc. where enlargement copies are needed. Will provide magnifications of 15x and 20x in one group, and 24x, 30x and 42x magnifications in the other.

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MIDGET MODEL CEMENT FINISHING MACHINE — Item 5

A new "midget" model 4-blade cement finishing machine is announced by Superior Cement Tool Corp. Weighs only 75 pounds. Small enough to pass through narrow doorways and light enough for one man to carry. Permits operator to switch blade pitch while unit is in motion—thereby floating and troweling concrete in one non-stop operation. Blade pitch changes up to 30° for polishing purposes. Powered by a 1.5 hp. gasoline motor. Blade sweep diameter is 23".

This column describes new products of general interest to professional engineers. For further information, fill in the coupon provided and mail to the AMERICAN ENGINEER.

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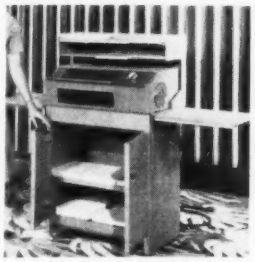
COPYING MACHINE AND CABINET — Item 6



Shown is the THERMO-FAX "Fourteen" brand copying machine, resting on the cabinet floor-stand—both are new products announced by 3M. Accommodates originals up to 14" wide. Original and copy paper are placed together, inserted into an opening on the front, and returned automatically to the operator in four to seven seconds with the copy ready for immediate use. Cabinet floor-stand converts table-top models to floor models, and provides storage space for copy paper and supplies

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ACID HANDLING SYSTEM — Item 7

Graver Water Conditioning Co. is offering a method of acid handling which is of importance to plants using acid in carboys and drums. Can be furnished as part of the regenerant system of water treatment processes such as demineralization, hydrogen zeolite ion exchange and acid stabilization. Provides a safe and simple method of handling any amount of acid that must be diluted with water. Known as the Graver Vacuum Acid Handling System, it enables the transfer, measurement and dilution of acid to be accomplished without the necessity of lifting carboys or drums and without subjecting any vessels to positive pressures.

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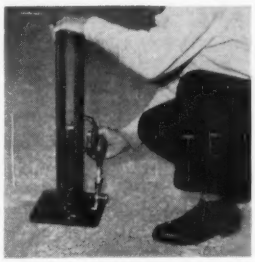
IN-PLACE DENSITY TESTS OF SOILS — Item 8



Rapid density tests of soils and similar materials can be made easily using the new "Volumeasure" recently introduced by Soiltest, Inc. Can be used on both research and construction projects where soils and other materials are being evaluated for natural or compacted in-place densities. Operates on a water filled balloon principle. Volume measurements are read directly on a graduated cylinder, precision calibrated to .00025 ft. divisions, which has a 1/20 cubic ft. capacity. Weighs less than 13 pounds.

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POCKET pH METER — Item 10

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(*Continued from page 24*)

plant set a record by completing 56 of these slabs in one week, 16 more than the schedule of 3000 feet of complete bridge a week called for.

Reinforcing wires of special high-strength steel were strung between one fixed and one adjustable anchorage, then stretched by jacking devices until the tension in each wire reached a predetermined stress. The transverse reinforcement was then installed, and the concrete was placed and cured. When the concrete had gained sufficient strength, the pretensioned wires were cut simultaneously at the ends of each span in the series, placing the concrete under compression. The spans were lifted from the forms, using a gantry crane of 200-ton capacity, loaded on barges, transported to the site and set in position.

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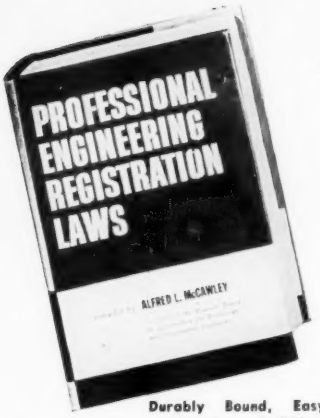

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The major purpose of the *Criteria* is perhaps best summarized by the continuing language from the introduction:

"As most engineers are employees, professional recognition is most significant in its application to the employed engineer-employer relationship. The professional status of the employed engineer, in all of its manifold aspects, needs to be fully recognized by the employed engineer and his employer if full and complete professional growth of the engineering profession is to be developed."

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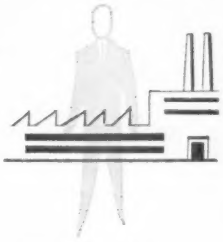

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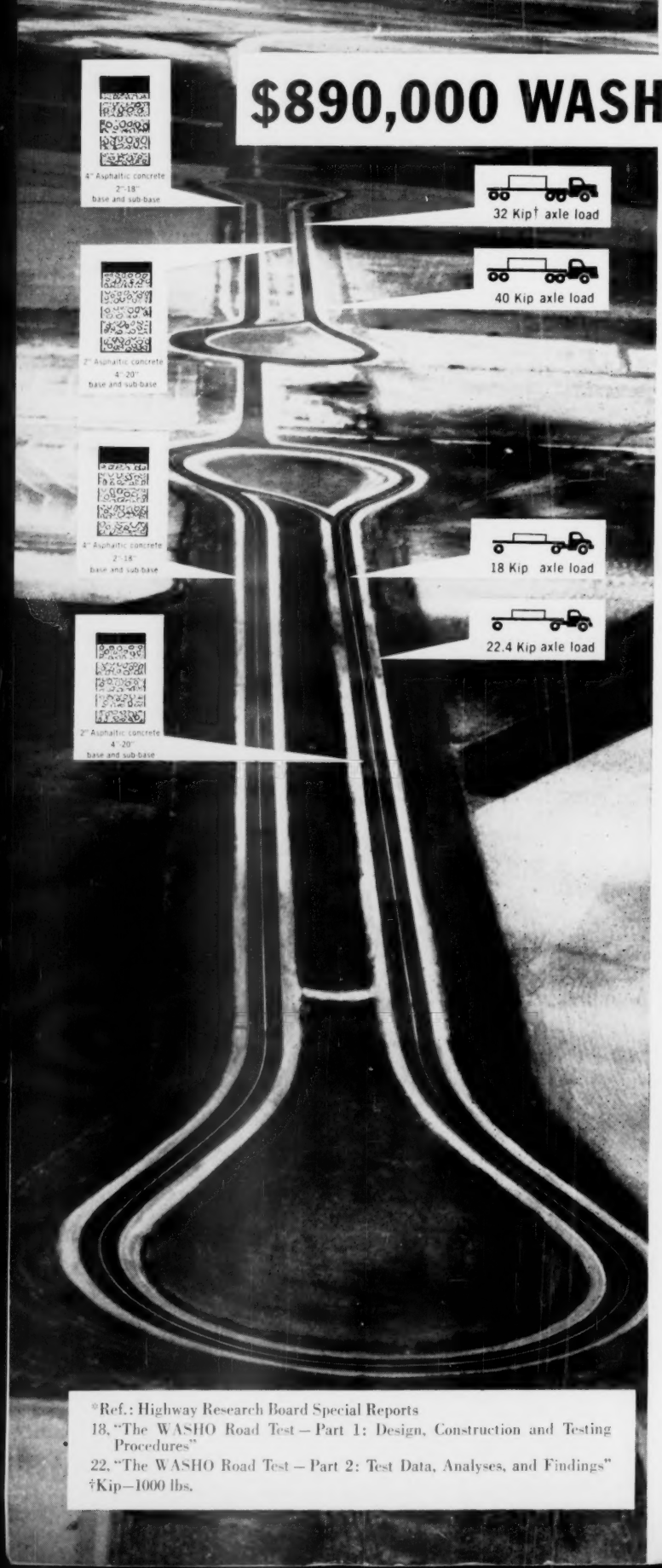

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*Ref.: Highway Research Board Special Reports
18, "The WASHO Road Test — Part 1: Design, Construction and Testing Procedures"
22, "The WASHO Road Test — Part 2: Test Data, Analyses, and Findings"
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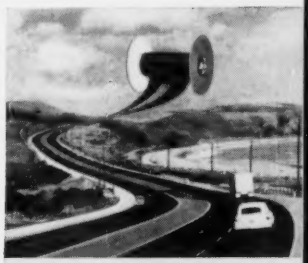

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